2004 Research Catch and Effort Data on Nearshore Reef-fishes in British Columbia Statistical Area 12

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by

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ABSTRACT

Yamanaka, K.L., and Lacko, L.C. 2008. 2004 Research catch and effort data on nearshore reef-fishes in British Columbia Statistical Area 12. Can. Tech. Rep. Fish. Aquat. Sci. 2803: ix + 45 p.

A research program in support of nearshore reef-fish stock assessment in Johnstone Strait was initiated in 1986. This report summarizes data collected during a 2004 research survey and compares these data to similar data collected during surveys in 1986, 1987, 1988 and 1992. Research catch and effort data are collected by angling with jigging rods and level wind reels using frozen herring as bait. Three depth intervals are fished (5 - 40 m, 41-70 m and 71-100 m) at most of the 10 study sites visited. In 2004, eighteen fish species were caught during the survey, eight of which were rockfishes. Quillback rockfish (*Sebastes maliger*) and kelp greenling (*Hexigrammos decagrammus*) were the most commonly caught species. Quillback rockfish size and age increase with depth fished. Quillback rockfish males are larger in size and older than the females. The mean age of quillback rockfish in 2004 is 15 years and has decreased from 22 years in 1986. Age at 50% maturity in 2004 is 10.6 and 9.6 for males and females, respectively. A large 1985 quillback rockfish year class was first detected in the survey as 7 year old fish in 1992 and still persists as 19 year olds in 2004. There is a decline in quillback rockfish catch rate over the survey series. Declines between 1986 and 2004 are estimated to be 68% and 58% for catch rate in weight and numbers, respectively.

RÉSUMÉ

Yamanaka, K.L., and Lacko, L.C. 2008. 2004 Research catch and effort data on nearshore reef-fishes in British Columbia Statistical Area 12. Can. Tech. Rep. Fish. Aquat. Sci. 2803: ix + 45 p.

Un programme de recherche visant l'évaluation des stocks de poissons de récifs près du littoral a été lancé dans le détroit de Johnstone en 1986. Ce rapport résume les données recueillies pendant un relevé mené en 2004 et les compare à des données semblables tirées de relevés de 1986, 1987, 1988 et 1992. Les données scientifiques sur les captures et l'effort sont recueillies à la pêche à la turlutte avec moulinet. Des harengs congelés ont servi d'appâts. Trois intervalles de profondeur (5 - 40 m, 41-70 m et 71-100 m) ont été échantillonnés dans la plupart des 10 sites d'étude visités. En 2004, 18 espèces de poissons ont été capturées pendant le relevé; 8 d'entre elles étaient des sébastes. Le sébaste à dos épineux (*Sebastes maliger*) et le sourcil de varech (*Hexigrammos decagrammus*) étaient les deux espèces les plus pêchées. La taille et l'âge des sébastes à dos épineux augmentaient avec la profondeur. Les mâles de cette espèce étaient plus gros et plus vieux que les femelles. L'âge moyen des sébastes à dos épineux en 2004 (15 ans) a baissé par rapport à l'âge moyen observé en 1986 (22 ans). En 2004, l'âge où 50 % des sébastes avaient atteint la maturité était de 10,6 pour les mâles et de 9,6 pour les femelles. Une importante classe d'âge de sébastes à dos épineux de 1985, détectée pour la première fois en 1992 alors que les poissons étaient âgés de 7 ans, persiste toujours; les individus étaient âgés de 19 ans en 2004. On observe une baisse du taux de capture de sébastes à dos épineux dans la série de relevés. Le déclin de 1986 à 2004 est estimé à 68 % pour ce qui est du poids et à 58 % pour ce qui est du nombre d'individus.

INTRODUCTION

As part of an assessment program for nearshore reef-fishes initiated in 1984, hook and line jig fishing surveys were developed to monitor fish catch rate and population parameters in nearshore reef habitats. Since 1986, ten research sites in Statistical Area 12 have been surveyed, intermittently, with standardized jig fishing gear and methods (Richards and Cass 1987; Richards and Hand 1987; Richards et al. 1988; Yamanaka and Richards 1993). As part of the Rockfish Conservation Strategy, in response to concerns over the status of the quillback rockfish stock and the lack of assessment data, a jig survey was conducted in 2004. This report summarizes catch composition, catch rate and biological data from this 2004 research jig fishing survey and compares these data from previous surveys.

METHODS

FISHING SITES AND DATES

In the first year of the jig surveys, research fishing sites were randomly selected from all 1 minute latitude by 1 minute longitude blocks that contained shoreline, within a 45 minute boat ride from Telegraph Cove (Richards and Cass 1985). The same ten fishing sites have been fished in every survey (Figure 1). Within each site, three depth intervals (5 - 40m, 41-70 m and 71-100 m) were fished, with the exception of sites 4, 36, and 42 where these depths were not available within the site (Table 1). The total number of sets by year range from 101 in 2004 to 125 in 1992 (Table 2). In 2004, research fishing sites were surveyed from June 2nd to 11th. In the 1980's, the sites were fished between June 16th - 26th and in 1992, between June 1st - 11th.

FISHING VESSELS AND GEAR

The Pacific Biological Station's Lifetimer, a 24 foot (7.32 m) welded aluminum vessel with a small cabin, was used to conduct the survey. Three fishers used this vessel throughout the survey. In addition, the Sea-Toad, an 18 foot (5.5 m) welded aluminum vessel with a center console, was deployed and used by three fishers from June 4th to 7th.

The fishing gear used was similar to that used in previous surveys (Yamanaka and Richards 1993). Halibut fishing rods (Abu Garcia Workhorse) were used with 20 lb test monofilament fishing line (Figure 2a). The main fishing line ended with a swivel to attach to the fishing set-up. The fishing set-up consists of a 3 foot long 20 lb test monofilament line with a swivel attached to the line and stopped between two beads, knotted 6 inches above an 8 oz cannon ball (Figure 2b). A 3 foot long, 15 lb test leader

with a pair of 3/0 stainless Mustad brand hooks (spaced 6 cm apart) was then tied to the swivel on the weight set-up (Figure 2c). Hooks were baited with a single 12 cm whole frozen herring.

FISHING TECHNIQUES

The angling techniques and methods used on the 2004 research survey follow those developed in 1984-85 (Richards et al. 1985; Richards and Cass 1985). During the survey every site and depth interval was fished on at least two different days by each vessel and each site/depth was fished by only one vessel in a day. Within each site, three depth intervals (5 - 40 m, 41-70 m and 71-100 m) were fished, with the exception of sites 4, 36, and 42 (Table 1). Depth sounders were used to stay within a depth interval while fishing. Once at a site/depth, the vessels either drifted with the current or if the current or wind caused too much vessel movement, the motor was engaged to maintain position.

Fishing time was recorded as the length of time the fishing gear was in position, fishing near the sea floor, and was logged using a digital timer attached to each fishing rod. The timer was started by the fisher when the fishing gear reached the bottom and stopped when a fish struck the bait or when the gear was retrieved. Fishing sets were standardized to 20 minutes of total fishing time, recorded for all fishers combined. Fishing was terminated early if ten rockfish were caught (we did not want to unnecessarily deplete the stock) or when current and wind conditions became unfavorable. Other information recorded for the fishing set were sea state, tidal phase, wind direction, sunlight and percent cloud cover.

BIOLOGICAL SAMPLING

Rockfish and lingcod were retained for biological sampling while all other species were measured for length and then released. Dogfish and kelp greenlings were also sexed by external features, claspers and colour, respectively before release. Fish retained for biological sampling were tagged and recorded by fisher. Biological sampling was conducted at the end of the fishing day. For rockfish, fork length and weight were measured, gonads were visually examined for sex and maturity (based on Westrheim 1975, Appendix Table 4) and otoliths collected for ageing (MacLellan 1997). Sampling was similar for lingcod, however, the 4th to the 8th, second dorsal fin rays were collected for ageing rather than the otoliths (Chilton and Beamish 1982).

CATCH RATE

The catch rate for quillback rockfish is expressed as:

$$U = \Sigma N_s / \Sigma E_s \text{ or } U = \Sigma W_s / \Sigma E_s$$

where N is numbers of fish caught and W is the weight of fish caught in kilograms
s denotes the fishing set and E is effort in hours fished for all fishers combined.

ABUNDANCE INDEX

To examine catch rate trends for quillback rockfish over time, non-zero catch rate data were log2 transformed and annual relative growth rate and the accumulated relative change over the time series were calculated (Schnute et al. 2004). This relative abundance index was derived from common site/depth data over all years of the jig survey. Annual relative growth rate is derived from

$$r = 2^b - 1$$

where r is the annual relative growth rate and
b is the slope of the regression line through median log2 transformed catch rate values

and the accumulated relative change is derived from

$$R_l = 2^{b(l-1)} - 1$$

where R is the relative change over the time series of observations and
l is the number of years lapsed over the time series
b is the annual relative growth rate.

RESULTS AND DISCUSSION

DATA

Raw field and electronic data collected during this survey are stored and maintained by the Groundfish Data Unit at the Pacific Biological Station in Nanaimo. The electronic data is maintained in the GFBIO database (http://pacpbsgfdb/sql/default.htm) and can be accessed with the trip identifier 55242 for the PBS Lifetimer and 55243 for the Sea-Toad.

FISHING SETS AND BIOLOGICAL DATA

The PBS Lifetimer fished 68 sets and the Sea Toad fished 33 sets for a total of 101 fishing sets during the 2004 survey (Table 2 and Appendix Table 1). Codes and descriptions of sea state and tidal phase are listed in Appendix Table 2. Biological data for rockfish are summarized in Appendix Table 4 and for all other species in Appendix Table 5. Rockfish maturity codes and descriptions are listed in Appendix Table 6.

SPECIES COMPOSITION

During the 2004 survey, 18 fish species were caught, 8 of which were rockfish (Appendix Table 1). A total of 414 fish were caught on the survey. Quillback rockfish was the most common species in the catch at 176 fish, followed by kelp greenling (*Hexagrammos decagrammus)* at 107 fish. Other rockfish species caught were yellowtail (*S. flavidus)*, copper (*S. caurinus)*, black *(S. melanops)*, yelloweye *(S. ruberrimus)*, redstripe *(S. proriger)*, tiger *(S. nigrocinctus)* and greenstriped (*S. elongatus)*.

A list of species caught over all surveys (1986 to 2004) is presented, by year, in Table 4. Eleven of the 35 species have been caught in all five surveys. Five rockfish species: black, copper, quillback, yelloweye and yellowtail were caught in all years of the survey.

Quillback rockfish was the most commonly caught rockfish and comprised 11.1% to 100% of the total catch by fishing site/depth (Table 3). Lingcod, copper and yelloweye rockfishes were caught in low proportions at 11, 9 and 3 of the 26 site/depths, respectively. The proportion of quillback rockfish in the catch has generally declined between 1986 and 2004 (Table 4). In 2004, 43% of the fish caught were quillback rockfish, compared with an average of 59% for the 1986 to 1988 surveys. Kelp greenling has generally increased in the proportion of total catch between 1986 and 2004.

BIOLOGICAL SAMPLES

Size

Quillback rockfish size and age summaries are shown for 2004 in Table 6. Size and age of quillback rockfish increase with depth. This ontogenic movement has been noted in previous jig surveys and in other rockfish species in California (Lea et al. 1999). Females appear to be slightly smaller and younger than the males.

The mean age of quillback rockfish caught in the jig survey has decreased from a high of 22.2 in 1986 to a low of 13.2 in 1992 when a strong age-7 cohort was evident in the survey (Table 8 and Figure 7). In the 1992 survey, the large 1985 year class accounted

for 28.5% of the age sample (Yamanaka and Richards 1993). This year class can be seen as 7 year olds in 1992 and 19 year olds, 12 years later in 2004. Mean age of quillback rockfish, in this geographic area, is highly influenced by this aging 1985 year class.

Weight-length relationships for quillback rockfish in all survey years combined are shown in Figure 3 and can be described by:

$W = aL^{b}$ where $a = 1.42\ e^{-5}$ for males and $1.24\ e^{-5}$ for females
$b = 3.07$ for males and 3.11 for females

Length at age data for quillback rockfish in all survey years combined is shown in Figure 3 and parameters of the von Bertalanffy growth equation:

$L_t = L_\infty [1-e^{-K(t-t_0)}]$ where: L_t = fork length at age t
L_∞ = maximum (asymptotic) fork length
K = growth constant
t = age
t_0 = theoretical age when length equals zero.

for quillback rockfish:

L_{inf} = 39.7 for males and 41.3 for females
K = 0.096 for males and 0.077 for females
t_o = 3.6 for males and 5.3 for females

Size data for other major species in the 2004 catch are shown in Table 7 and Figures 4 to 6. Kelp greenlings have not changed in size throughout the survey series (Figure 6.)

Age

Quillback rockfish age histograms are shown by survey year in Figure 7. The relatively large 6 and 19 age classes in 1986 are tracked through to 8 and 21 age classes in 1998 but are not tracked well in 1987. A relatively large age 7 year class in 1992 is also detected as 19 year olds in 2004. There is a truncation of older ages in the 1992 and 2004 surveys which may be evidence of a fishing effect on the population. Older individuals tend to be removed from the population over time, through fishing.

Quillback rockfish age histograms by depth interval and year are shown in Figures 8 to 10. Younger individuals tend to be more abundant in the shallow and middle depth intervals than in the deep, with the exception of 1992 where the very large age-7 year class was caught throughout all depths. The oldest age groups are more abundant in the deep depth interval and over time make up a smaller proportion of the overall catch.

Maturity

Maturity ogives for quillback rockfish are shown, by sex, for the years 1986 to 1988, 1992 and 2004, in Figures 11 to 13. Age at 50% maturity is earlier for females than for males in quillback rockfish. In 1986 to 1988, females reach 50% maturity at 10.5 years

and the males at 11.2 years. The age at 50% maturity decreased to 8.5 and 9.9 years for females and males, respectively, in 1992 and increased to 9.6 and 10.6 years in 2004.

CATCH RATE

Catch rates (in numbers of fish per hour) for quillback rockfish, kelp greenling, all rockfish species and all fish species were tested for differences with depth interval, sea state, tidal phase, wind direction, sunlight and cloud cover. There were significant differences in catch rate for kelp greenling and the "Total fish species" category with depth interval ($p<0.001$, Kruskal-Wallis). Catch rates were higher in the shallow depth interval. No other significant differences were detected.

For all fish species combined, catch rates by site/depth, ranged from 2.94 (site 36, depth 2) to 25.00 (site 6, depth 1) fish hr^{-1} (Table 5). Total rockfish and quillback rockfish catch rates by site/depth ranged from 0.74 to 12.11 fish hr^{-1} and 0.72 to 10.71 fish hr^{-1}, respectively. For quillback rockfish, the most productive was site 6 in the shallow and middle depth interval and site 65 in the deep depth interval.

ABUNDANCE INDEX

Non-zero median quillback rockfish catch rates in weight and in numbers, by set are shown in Figure 15. Non-zero catch rates in weight and numbers of fish were log2 transformed and a regression line fit through the median catch rates. The slope of the regression line through the annual median values shows a declining trend.

Kelp greenling and lingcod growth rates, in numbers of fish, are -1.4% and -18.5%, respectively between 1986 and 2004 (Figure 14). Catch rates have not changed over time for kelp greenlings. For lingcod, there is a slight decline through the series but the index is highly variable, particularly between 1986 and 1987(Figure 14).

Quillback rockfish annual relative growth rates are -6.1 % and -4.8% for catch rate in weight and number, respectively (Figure 15). The accumulated relative change over the time series of surveys from1986 to 2004 is -67.8 % and -58.5 % for catch rate in weight and number, respectively. Similar catch rate analyses for quillback rockfish weight and numbers, examined by depth interval, are shown in Figure 16 and 17, respectively.

The recruitment of the relatively large 1985 year-class in the 1992 survey is evident as their catch in weight is small relative to their catch in numbers. The greatest rates of decline are in the middle depth range. Young fish first recruit to the shallow depths and this supply of fish would tend to maintain catch rates over time. In the deep depths, fishing is difficult due to the current action on the light tackle used in the survey. As the currents build, the deep depths become unfishable as the gear is swept away without reaching the bottom. Once fish recruit to these deeper depths, the difficulty in fishing these depths may lead to less fishing effort and relatively less decline in catch rate over time.

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Table 1. Number of fishing sets by site, year and depth interval for all jig surveys.

SITE	YEAR	Depth		
		5-40m	41-70m	70-100m
4	1986	4	3	
4	1987	3	4	
4	1988	4	4	
4	1992	5	5	
4	2004	3	3	
6	1986	4	4	3
6	1987	4	4	5
6	1988	4	4	4
6	1992	6	4	4
6	2004	4	4	3
16	1986	4	4	4
16	1987	5	4	4
16	1988	4	4	4
16	1992	5	5	5
16	2004	4	4	4
22	1986	5	5	5
22	1987	5	5	4
22	1988	4	4	4
22	1992	6	6	6
22	2004	4	4	5
31	1986	4	4	4
31	1987	4	4	4
31	1988	4	4	4
31	1992	6	4	5
31	2004	5	4	4
36	1986	4	4	
36	1987	4	4	
36	1988	5	4	
36	1992	4	6	
36	2004	4	4	
38	1986	3	5	4
38	1987	4	5	5
38	1988	4	4	5
38	1992	4	4	5
38	2004	4	4	4
42	1986	4		
42	1987	4		
42	1988	4		
42	1992	6		
42	2004	4		
65	1986	4	4	4
65	1987	4	4	4
65	1988	4	4	4
65	1992	4	4	4
65	2004	4	4	3
66	1986	5	5	1
66	1987	4	4	3
66	1988	4	4	
66	1992	4	4	4
66	2004	4	4	3

Table 2. Total number of fishing sets by year and depth interval for all jig surveys.

YEAR	Set Count			Total sets
	5-40m	41-70m	70-100m	
1986	41	38	25	104
1987	41	38	29	108
1988	41	36	25	102
1992	50	42	33	125
2004	40	35	26	101

Table 3. Species composition of the 2004 combined catch, summarized by depth interval and survey fishing site. Number of records for that depth and site; NF, number of fish caught.

			Proportion by species [b]				
Depth [a]	Site	NF	QB	CO	YE	LC	Total RF
1	4	15	0.133	–	–	–	0.133
1	6	35	0.429	0.029	–	0.029	0.458
1	16	29	0.172	0.103	–	–	0.275
1	22	22	0.318	0.136	–	0.045	0.454
1	31	16	0.125	0.188	–	0.063	0.313
1	36	21	0.714	–	–	0.048	0.714
1	38	32	0.344	0.250	–	–	0.594
1	42	18	0.111	0.111	–	–	0.222
1	65	18	0.111	–	–	0.056	0.111
1	66	18	0.333	0.167	–	–	0.500
2	4	7	0.143	–	–	–	0.143
2	6	22	0.682	–	–	–	0.682
2	16	13	0.462	–	–	0.077	0.462
2	22	7	0.143	0.143	–	–	0.286
2	31	15	0.533	–	–	0.267	0.533
2	36	4	0.250	–	–	–	0.250
2	38	15	0.600	0.067	–	0.067	0.667
2	65	22	0.545	–	–	0.091	0.545
2	66	9	0.444	–	0.222	0.111	0.666
3	6	9	0.667	–	–	–	0.667
3	16	7	1.000	–	–	–	1.000
3	22	7	0.714	–	–	–	0.714
3	31	16	0.563	–	–	–	0.563
3	38	13	0.769	–	0.077	0.077	0.846
3	65	13	0.615	–	–	–	0.615
3	66	11	0.636	–	0.091	–	0.727

[a] Depth intervals: (1) 5-40 m; (2) 41-70 m; (3) 71-100m.
[b] Species codes: QB, quillback rockfish; CO, copper rockfish; YE, yelloweye rockfish; LC, lingcod.

Table 4. Fish caught by species and their proportion, by number, for all jig surveys in Area 12. Species caught in all years are shaded. The total number of fish and the total number of species caught by year are shown in summary at the bottom of the table.

Species	1986	1987	1988	1992	2004
QUILLBACK ROCKFISH	0.567	0.525	0.689	0.536	0.425
YELLOWTAIL ROCKFISH	0.110	0.098	0.045	0.083	0.085
KELP GREENLING	0.075	0.130	0.110	0.203	0.258
SPINY DOGFISH	0.074	0.072	0.017	0.015	0.007
BLACK ROCKFISH	0.034	0.027	0.008	0.008	0.012
LINGCOD	0.032	0.030	0.042	0.035	0.036
PACIFIC COD	0.027	0.025	0.003	0.009	0.012
COPPER ROCKFISH	0.023	0.060	0.035	0.062	0.060
YELLOWEYE ROCKFISH	0.020	0.010	0.022	0.007	0.010
SOUTHERN ROCK SOLE	0.009		0.003		
RED IRISH LORD	0.007	0.008	0.008	0.002	0.056
SPOTTED RATFISH	0.005	0.002	0.001	0.001	0.002
GREAT SCULPIN	0.005				
DUSKY ROCKFISH	0.004	0.002			
CHINOOK SALMON	0.004				
REDSTRIPE ROCKFISH	0.002		0.001	0.009	0.007
FLATHEAD SOLE	0.002				
BROWN IRISH LORD		0.003		0.001	0.010
TIGER ROCKFISH		0.002	0.003	0.001	0.002
WIDOW ROCKFISH		0.002	0.001	0.006	
SCULPINS		0.002			
PACIFIC STAGHORN SCULPIN		0.002			
RIGHTEYE FLOUNDERS		0.002			
GREENSTRIPED ROCKFISH			0.007	0.002	0.002
SABLEFISH			0.004	0.002	0.002
WALLEYE POLLOCK			0.001		
SHARPCHIN ROCKFISH				0.008	
PACIFIC SANDDAB				0.002	0.005
CANARY ROCKFISH				0.002	
SPECKLED SANDDAB				0.002	
UNKNOWN FISH				0.001	
CABEZON				0.001	
ARROWTOOTH FLOUNDER				0.001	
HARLEQUIN ROCKFISH				0.001	
DOVER SOLE					0.007
Total number of fish	557	600	763	1069	414
Total number of species caught	17	18	18	25	18

Table 5. Depth interval, site number, number of records for that depth (N), total number of fish caught (NF), total fishing time (h), catch per unit of effort (CPUE) by species (fish/hr), total rockfish CPUE, and total fish CPUE for the 2004 survey.

Depth [a]	Site	N	NF	Time	CPUE [b]					
					QB	CO	YE	LC	Total RF	Total
1	4	12	15	1.03	1.94	–	–	–	1.94	14.56
1	6	23	35	1.40	10.71	1.40	–	0.71	12.11	25.00
1	16	22	29	1.41	3.55	0.47	–	–	4.02	20.57
1	22	19	22	1.41	4.96	0.47	–	0.71	5.43	15.60
1	31	13	16	1.73	1.16	0.58	–	0.58	1.73	9.25
1	36	13	21	1.41	10.64	–	–	0.71	10.64	14.89
1	38	23	32	1.33	8.27	0.17	–	–	8.44	24.06
1	42	12	18	1.39	1.44	0.70	–	–	2.13	12.95
1	65	14	18	1.36	1.47	–	–	0.74	1.47	13.24
1	66	15	18	1.37	4.38	0.46	–	–	4.84	13.14
2	4	6	7	0.98	1.02	–	–	–	1.02	7.14
2	6	15	22	1.39	10.79	–	–	–	10.79	15.83
2	16	12	13	1.35	4.44	–	–	0.74	4.44	9.63
2	22	6	7	1.38	0.72	1.38	–	–	2.10	5.07
2	31	12	15	1.31	6.11	–	–	3.05	6.11	11.45
2	36	4	4	1.36	0.74	–	–	–	0.74	2.94
2	38	10	15	1.33	6.77	1.33	–	0.75	8.10	11.28
2	65	16	22	1.29	9.30	–	–	1.55	9.30	17.05
2	66	9	9	1.36	2.94	–	1.47	0.74	4.41	6.62
3	6	7	9	1.06	5.66	–	–	–	5.66	8.49
3	16	6	7	1.34	5.22	–	–	–	5.22	5.22
3	22	7	7	1.42	3.52	–	–	–	3.52	4.93
3	31	12	16	1.28	7.03	–	–	–	7.03	12.50
3	38	11	13	1.27	7.87	–	0.79	0.79	8.66	10.24
3	65	9	13	0.92	8.70	–	–	–	8.70	14.13
3	66	9	11	0.93	7.53	–	1.08	–	8.60	11.83

[a] Depth intervals: (1) 5-40 m; (2) 41-70 m; (3) 71-100m.
[b] Species codes: QB, quillback rockfish; CO, copper rockfish; YE, yelloweye rockfish; LC, lingcod.

Table 6. Quillback rockfish mean lengths (mm), weights (gm) and age by sex and depth interval with sample sizes (n) and standard errors (SE) in the 2004 survey.

Quillback Rockfish	Depth interval[a]	Length Sample size	Mean Length	Length SE	Weight sample size	Mean weight	Weight SE	Age Sample size	Mean Age	Age SE
male	1	33	309	6.2	33	519	27.6	33	13	0.8
male	2	26	328	8.0	26	647	47.7	26	15	1.8
male	3	21	369	10.1	21	909	68.8	21	19	2.9
female	1	34	303	5.9	34	497	29.7	34	12	0.9
female	2	31	326	6.0	31	615	34.3	31	13	0.8
female	3	30	375	8.0	30	963	61.4	29	17	1.0

[a] Depth intervals: (1) 5-40 m; (2) 41-70 m; (3) 71-100m.

Table 7. Mean lengths (mm), weights (gm) and age with sample sizes (n) and standard errors (SE) for major species caught in the 2004 survey.

Species	Depth interval[a]	Length Sample size	Mean Length	Length SE	Weight sample size	Mean weight	Weight SE
Kelp greenling	all	104	359	2.2	2	580	50.0
Yellowtail rockfish	all	31	336	9.2	31	599	50.8
Copper rockfish	all	24	345	11.8	24	630	51.4
Red irish lord	all	23	258	7.9	-	-	-
Lingcod	all	14	623	27.7	14	2453	409.0

[a] Depth intervals: (1) 5-40 m; (2) 41-70 m; (3) 71-100m

Table 8. Quillback rockfish age (yr) summary by year with sample sizes (n).

Year	n	Min	1st	median	mean	3rd	max
1986	313	3	11	20	22.21	28	67
1987	293	4	10	19	20.24	27	60
1988	519	3	11	20	21.70	27	65
1992	572	4	7	10	13.15	14	62
2004	174	5	10	12	14.71	19	63

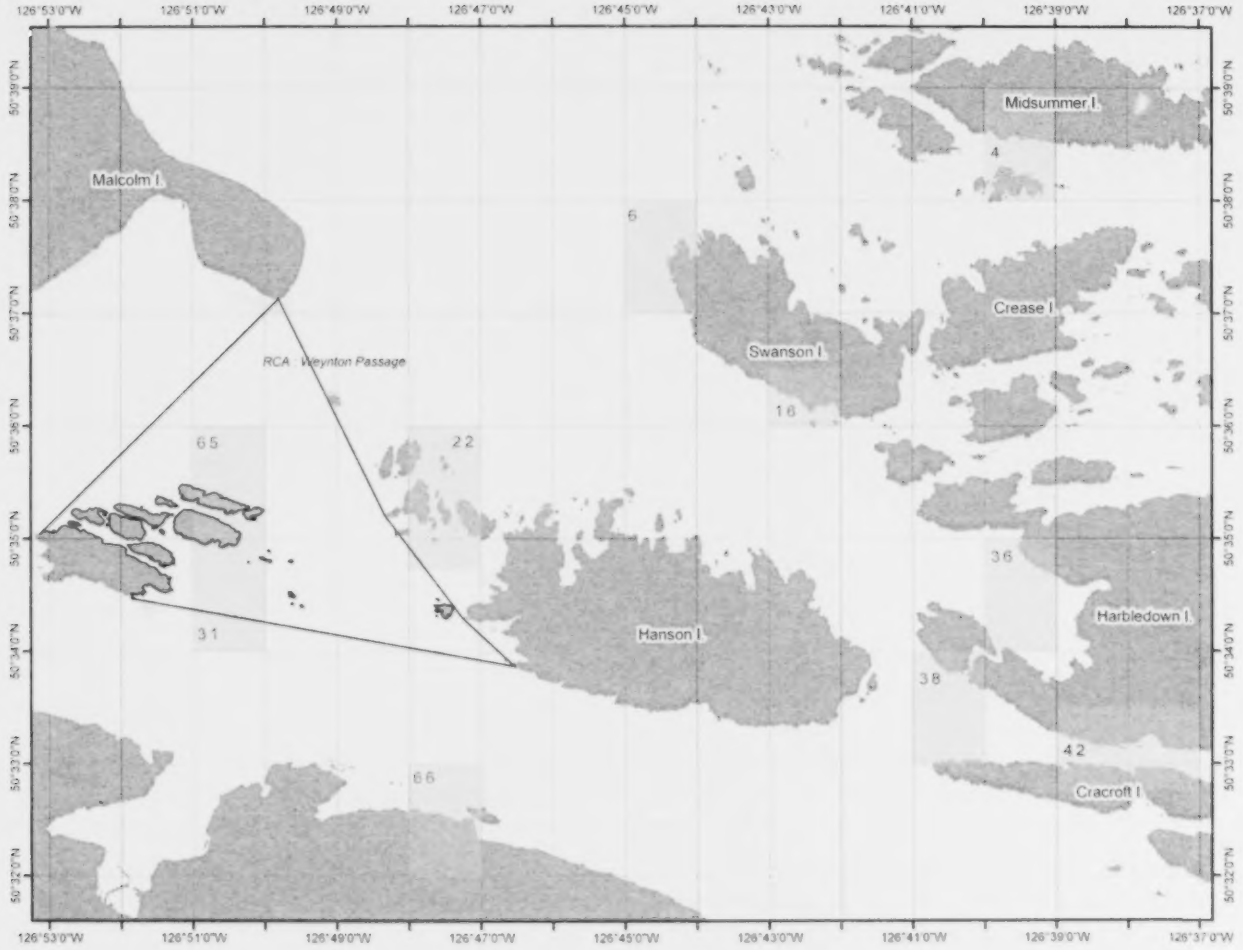

Figure 1. Location of the ten study sites in statistical area 12.

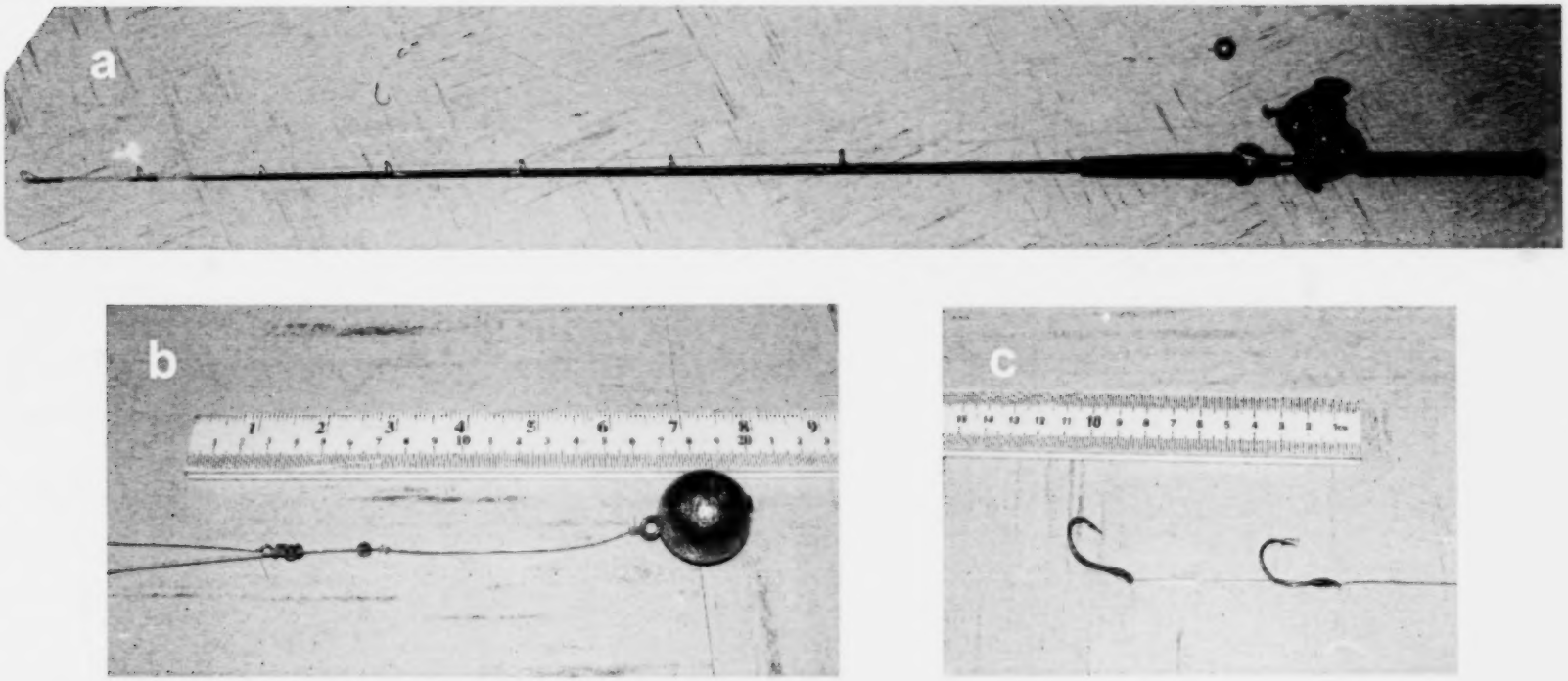

Figure 2. Fishing gear used during the survey with rod and reel (a), fishing weight (b) and hook set-up (c).

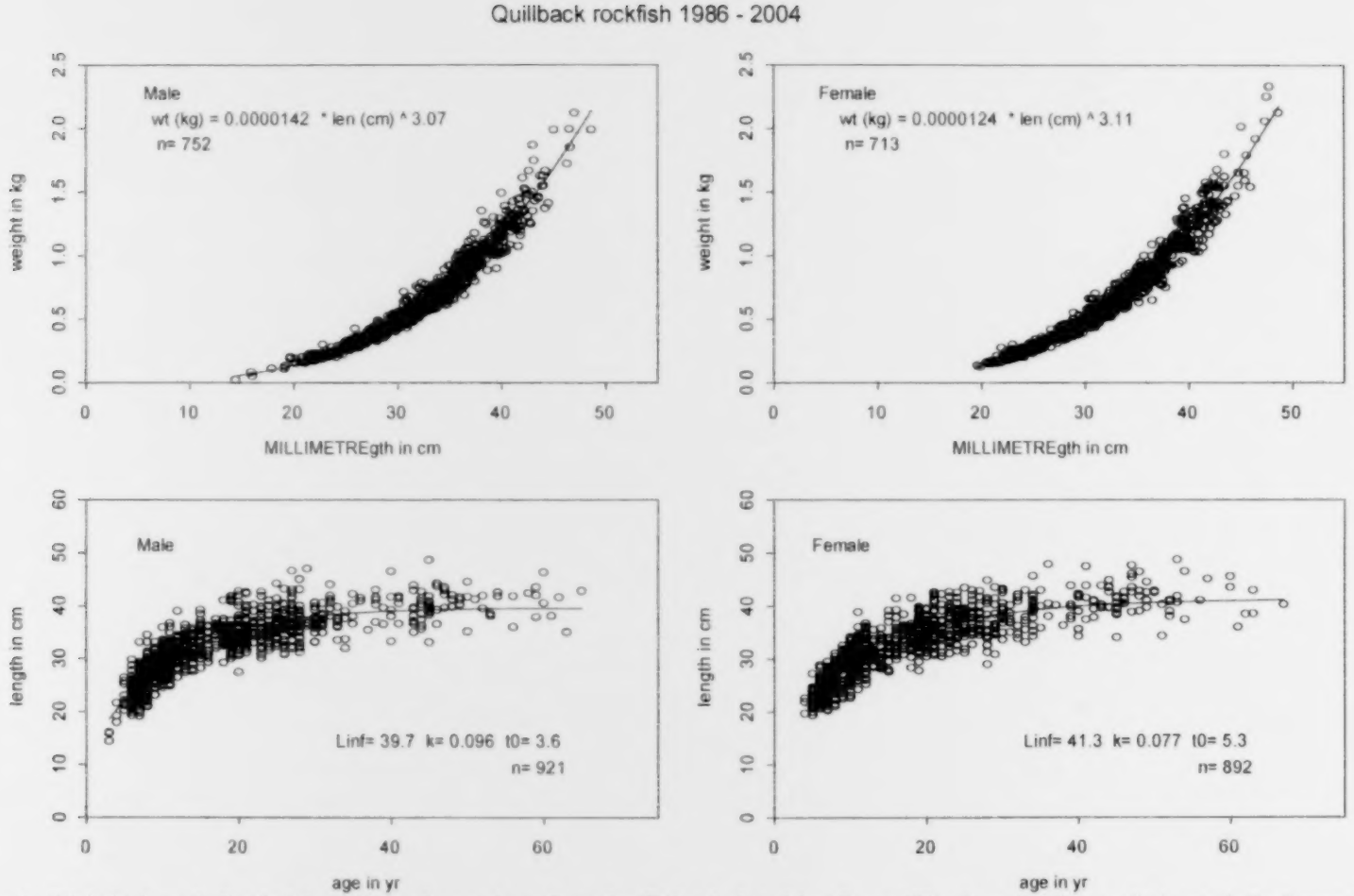

Figure 3. Weight-length (logistic) and length-age (von Bertalanffy) relationships for quillback rockfish caught in statistical area 12 during jig surveys from 1986 to 2004.

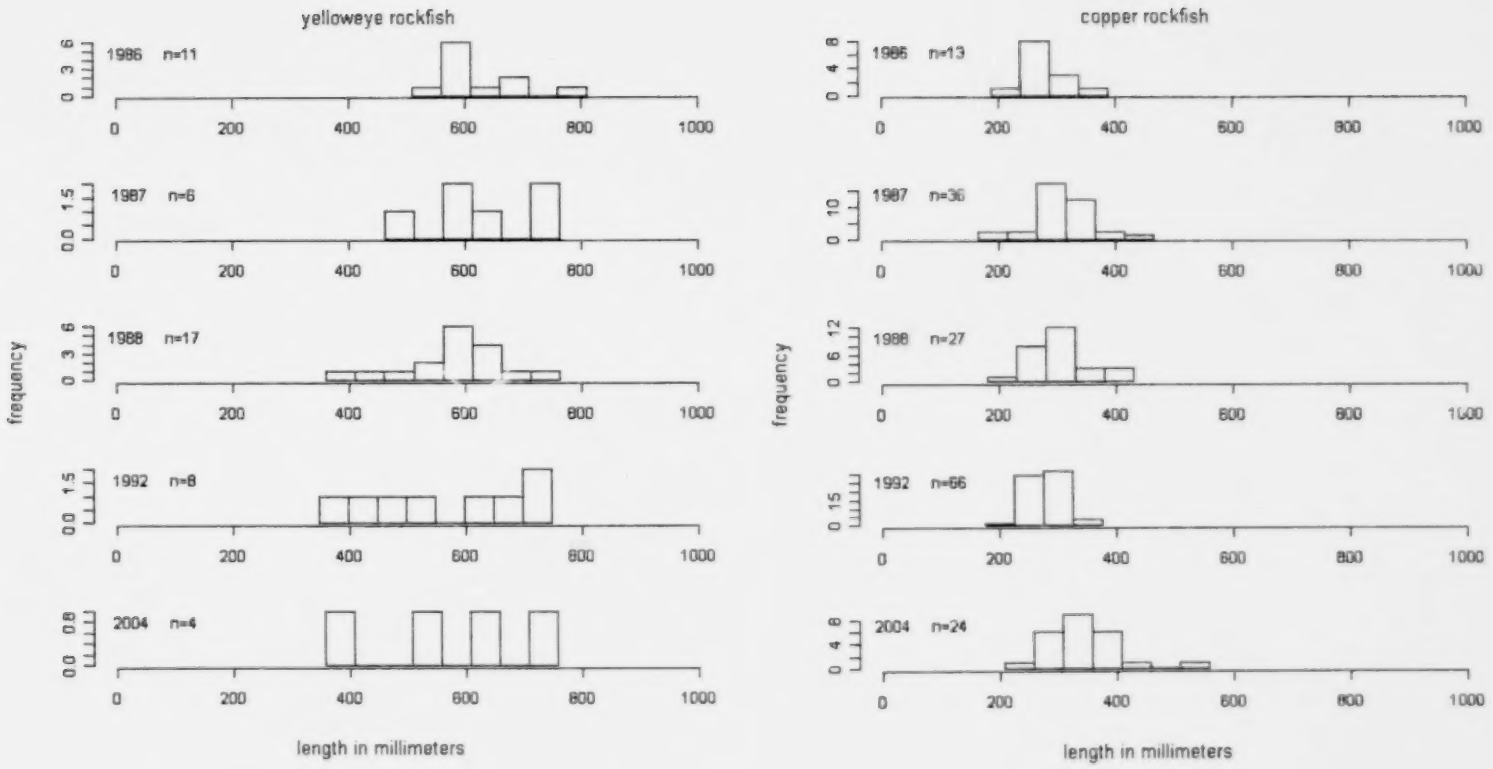

Figure 4. Length (mm) histograms (50 mm bins) by year for yelloweye (left) and copper rockfishes (right) caught during the jig surveys.

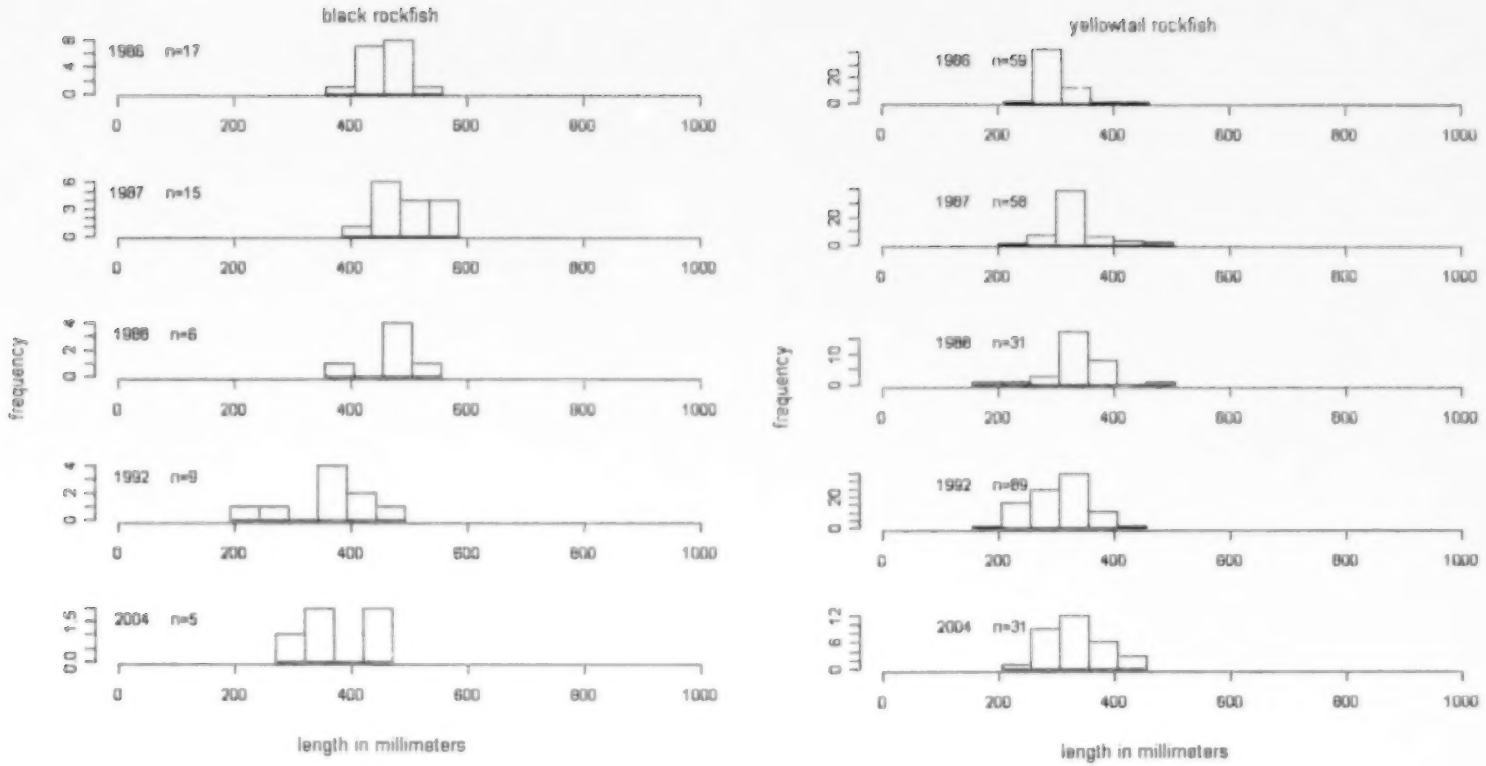

Figure 5. Length (mm) histograms (50 mm bins) by year for yellowtail (left) and black (right) rockfishes caught during the jig surveys.

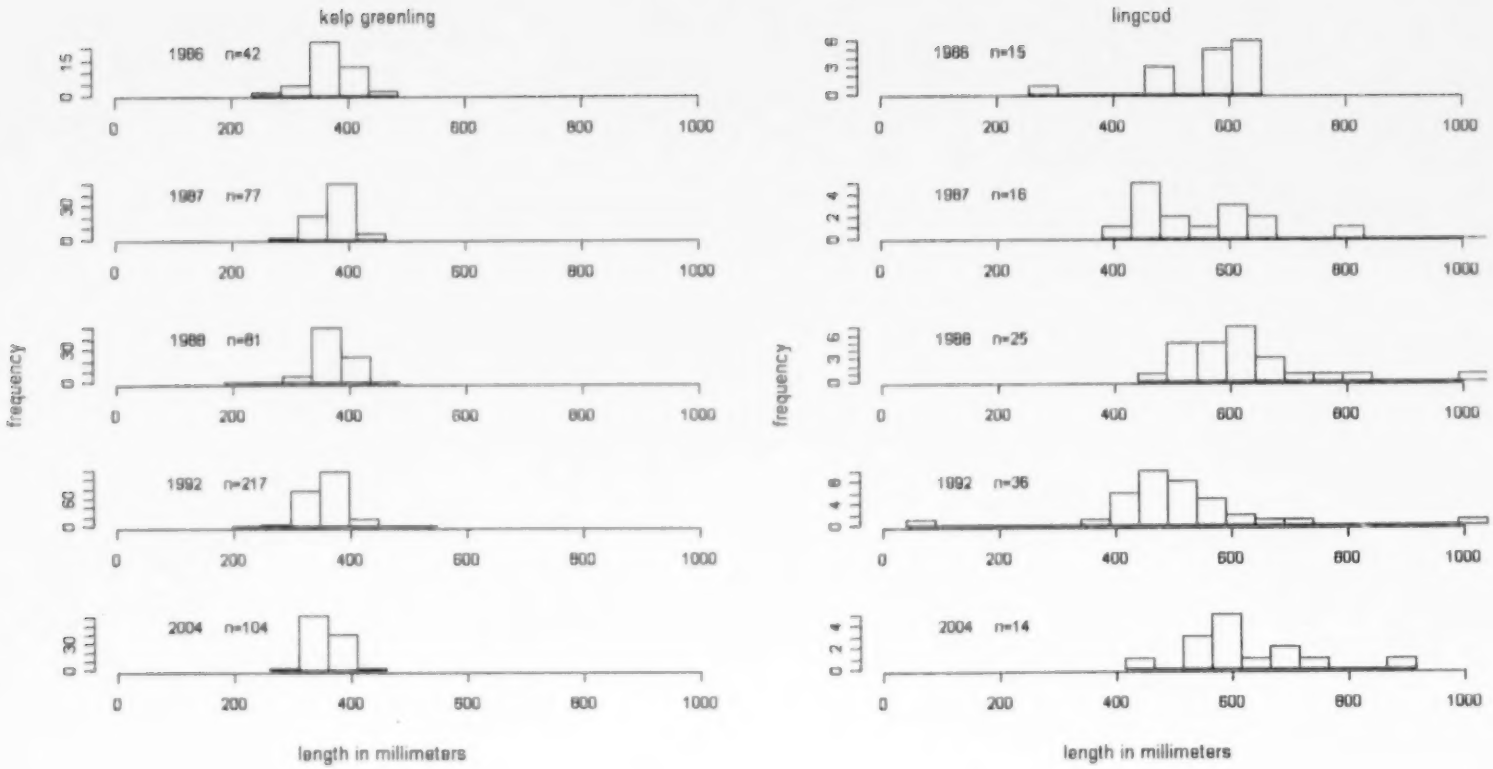

Figure 6. Length (mm) histograms (50 mm bins) by year for kelp greenling (left) and lingcod (right) caught during the jig surveys.

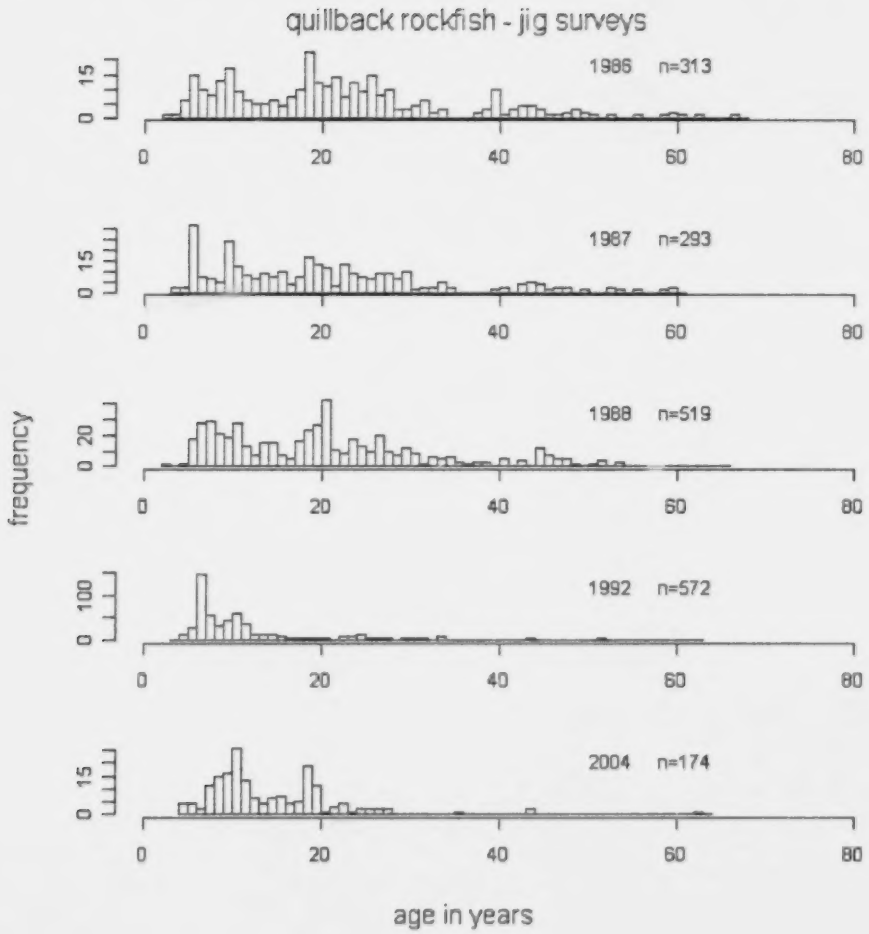

Figure 7. Age histograms by year for quillback rockfish caught during the jig surveys.

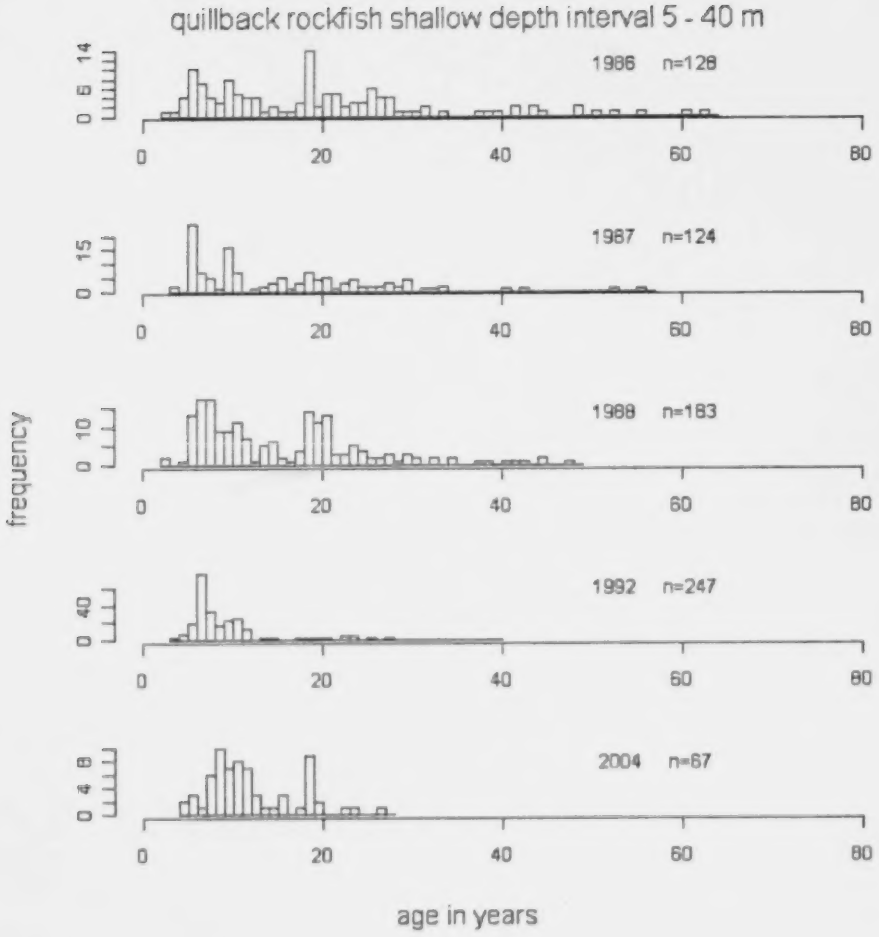

Figure 8. Age histograms by year for quillback rockfish caught in the shallow depth interval (5 – 40 metres) during the jig surveys.

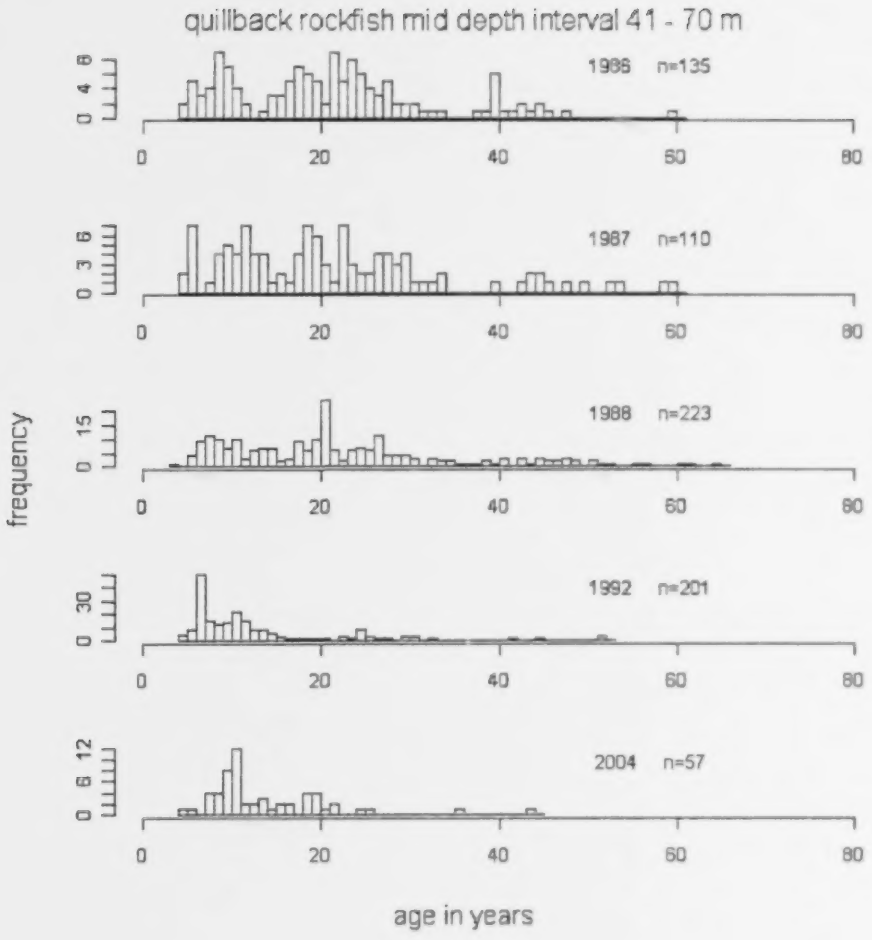

Figure 9. Age histograms by year for quillback rockfish caught in the mid depth interval (41 – 70 metres) during the jig surveys.

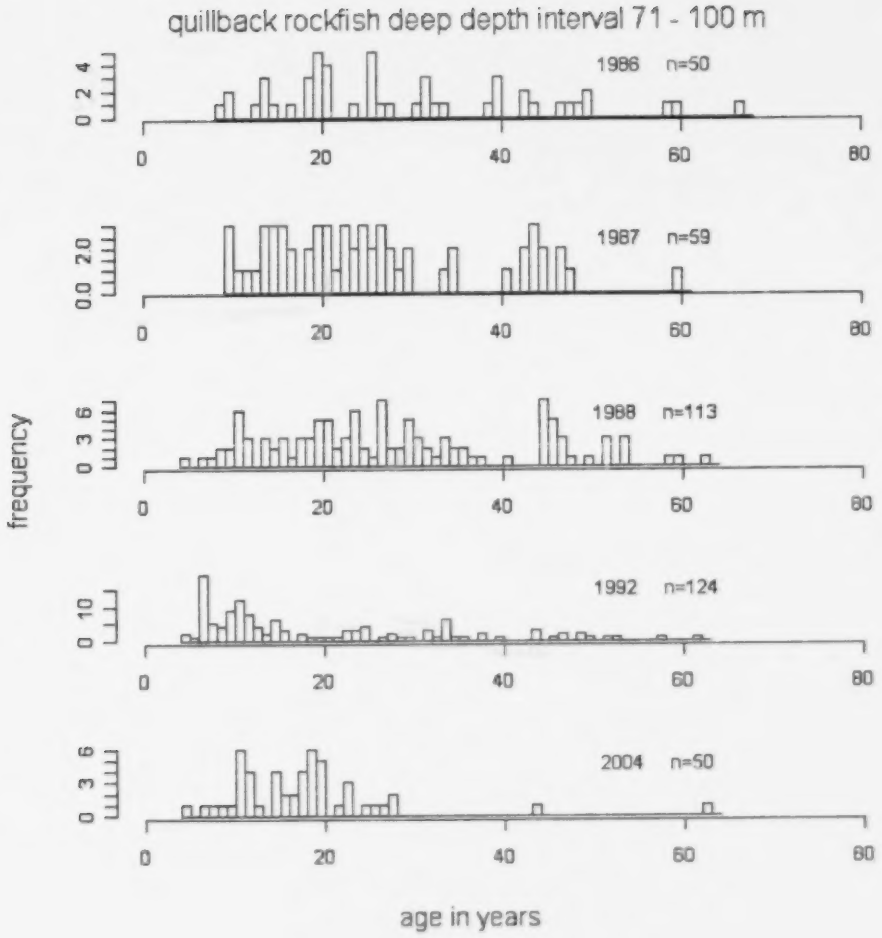

Figure 10. Age histograms by year for quillback rockfish caught in the deep depth interval (71 – 100 metres) during the jig surveys.

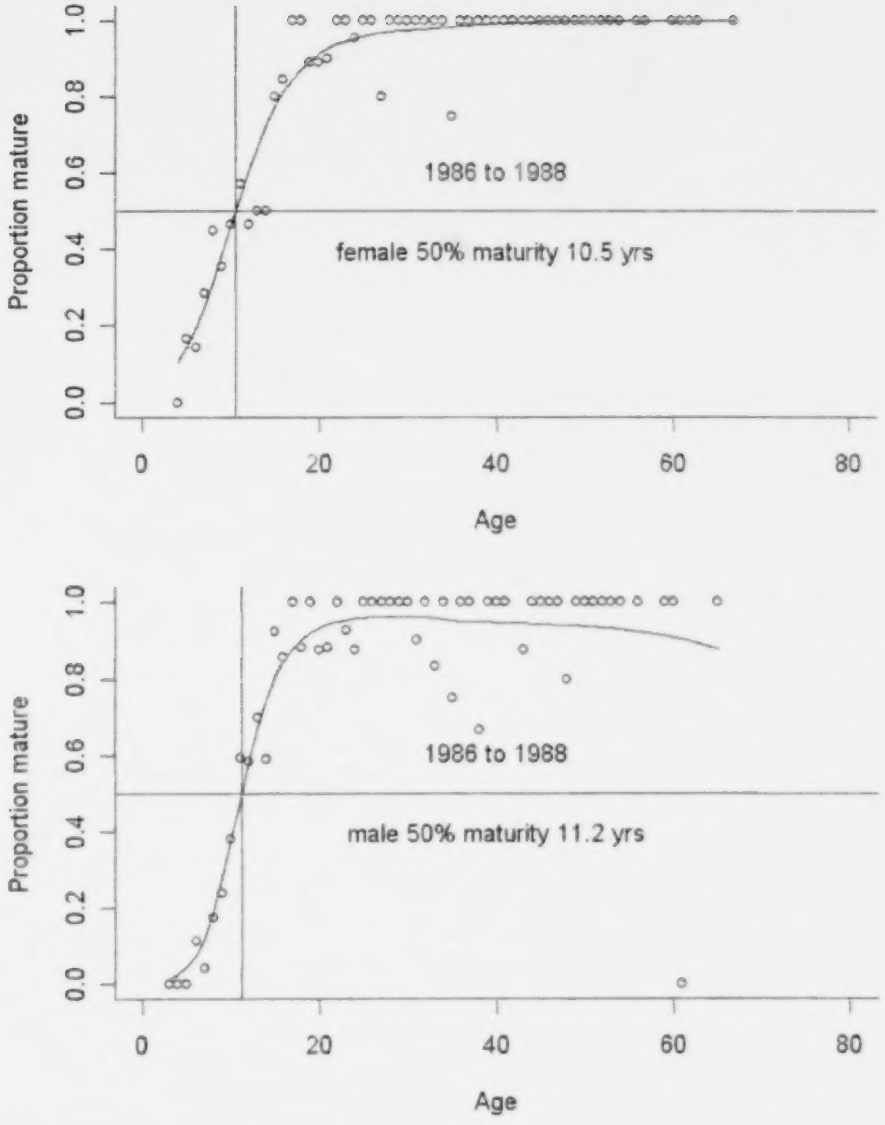

Figure 11. Maturity ogives (proportion of mature fish by age) for quillback rockfish, by sex, caught during the 1986, 1987 and 1988 jig surveys. Age at 50% maturity is shown.

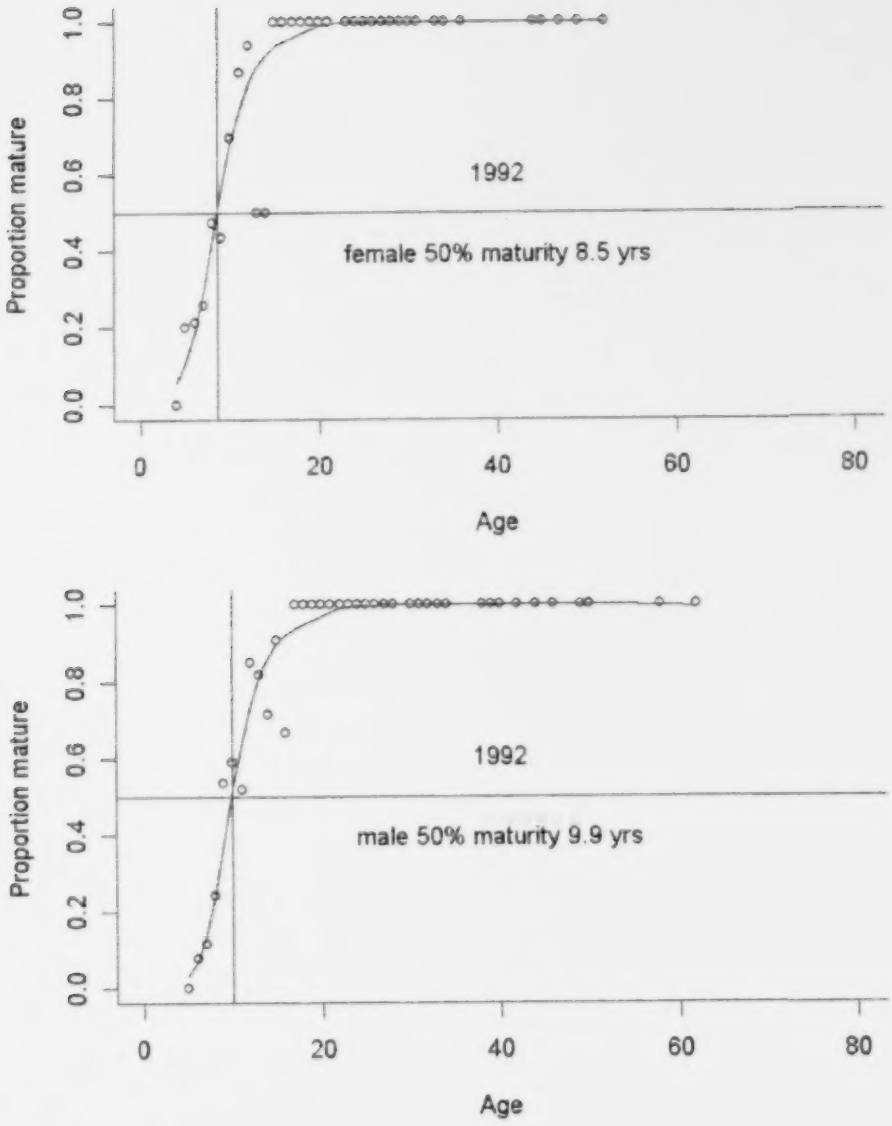

Figure 12. Maturity ogives (proportion of mature fish by age) for quillback rockfish, by sex, caught during the 1992 jig survey. Age at 50% maturity is shown.

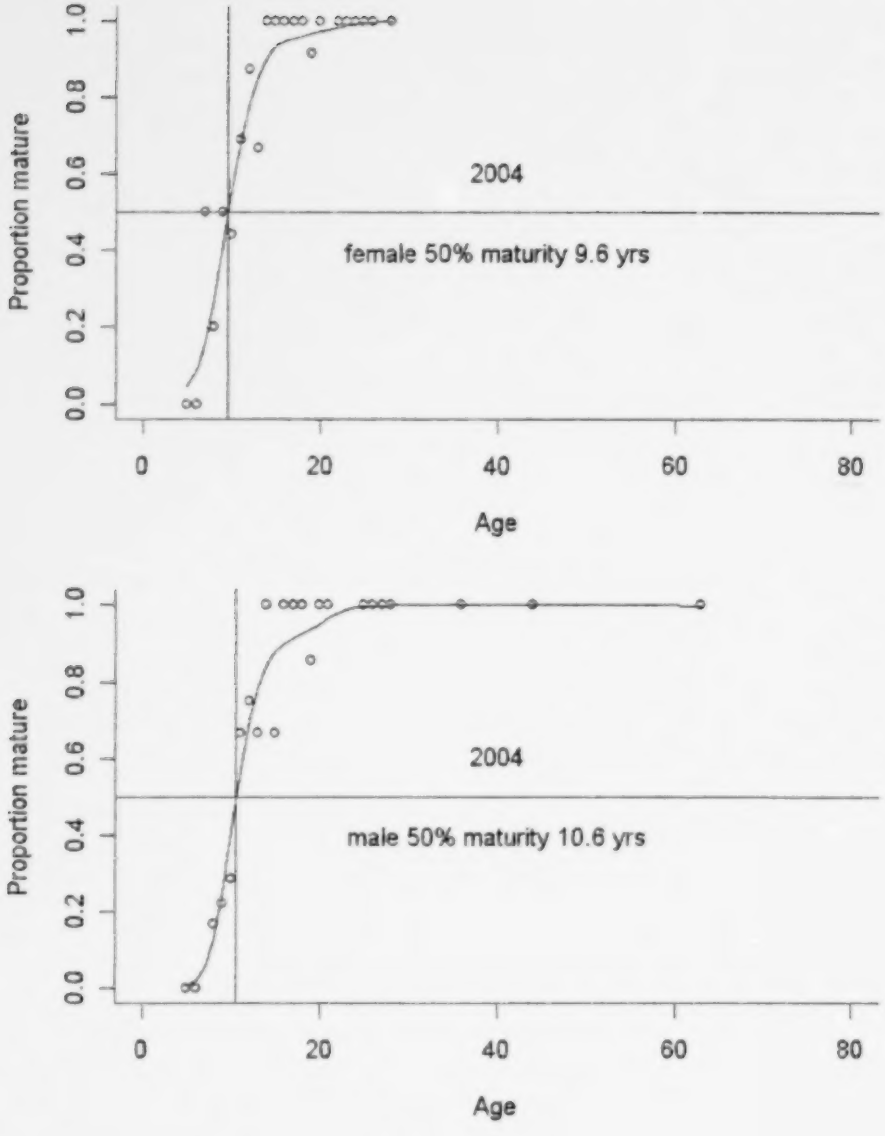

Figure 13. Maturity ogives (proportion of mature fish by age) for quillback rockfish, by sex, caught during the 2004 jig survey. Age at 50% maturity is shown.

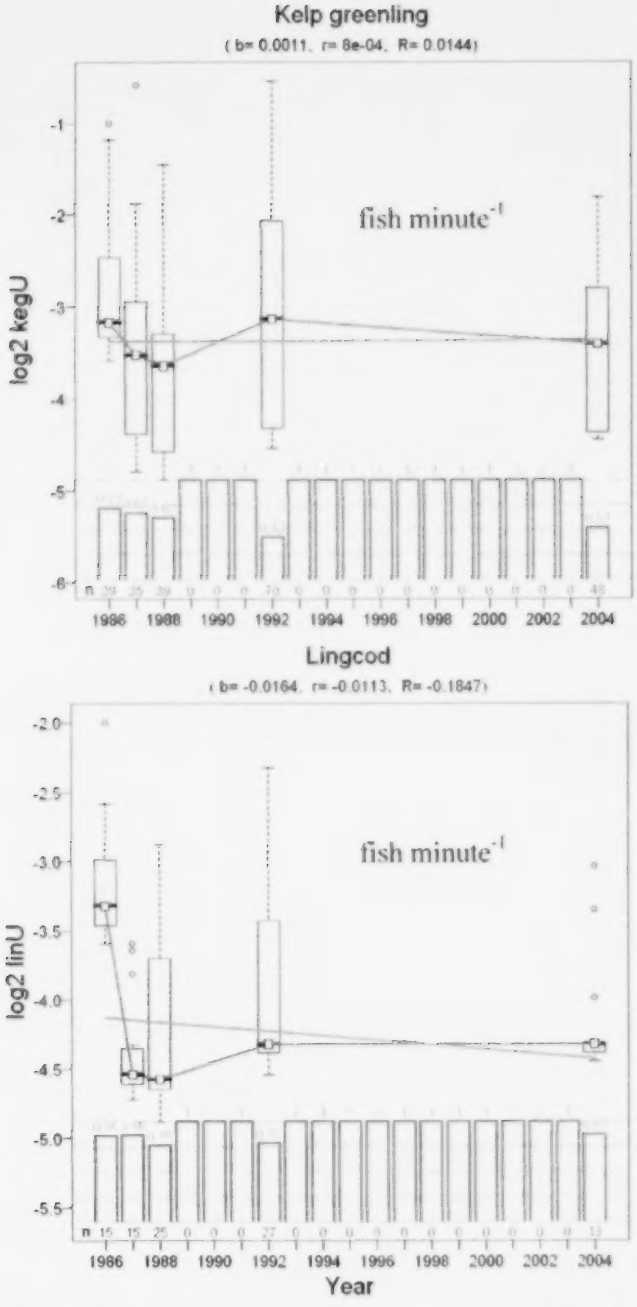

Figure 14. Kelp greenling (top) and lingcod (bottom) relative abundance index log2, over all depths surveyed, in numbers of fish per minute^{-1} for non-zero catches from the jig surveys conducted in 1986, 1987, 1988, 1992 and 2004. The regression line of the median non-zero catch rates is shown as a green line. Annual growth rate (r) and the series growth rate (R) are shown. Red columns at the bottom of the plots show the proportion of zero catches by year and the blue numbers (n) under the columns show the number of positive sets.

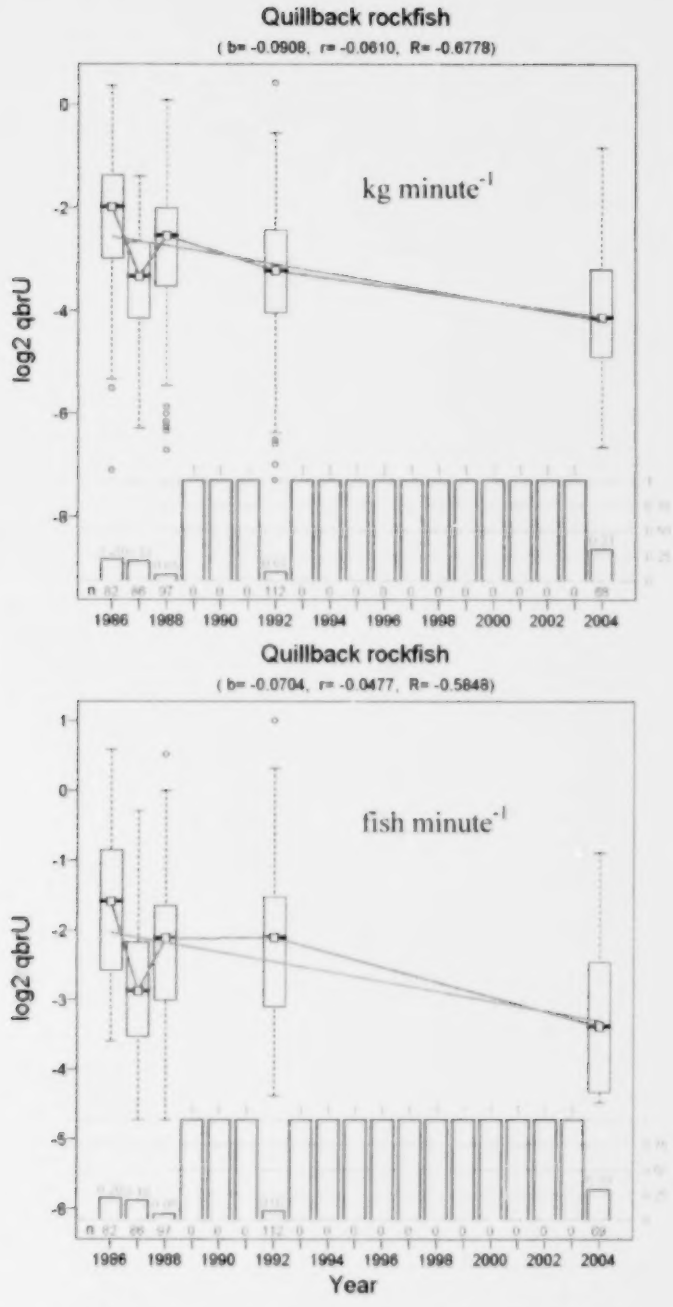

Figure 15. Quillback rockfish relative abundance index log2, over all depths surveyed, in weight of fish minute^{-1} (upper panel) and numbers of fish per minute^{-1} (lower panel) for non-zero catches from the jig surveys conducted in 1986, 1987, 1988, 1992 and 2004. The regression line of the median non-zero catch rates is shown as a green line. Annual growth rate (r) and the series growth rate (R) are shown. Red columns at the bottom of the plots show the proportion of zero catches by year and the blue numbers (n) under the columns show the number of positive sets.

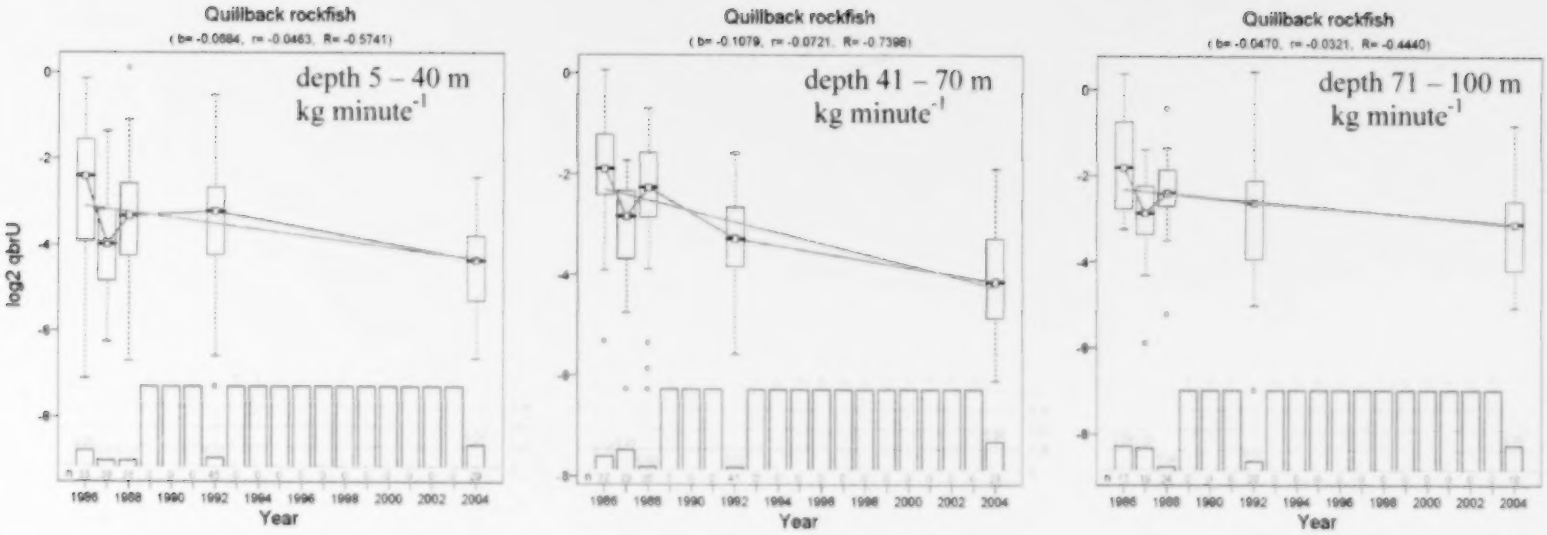

Figure 16. Quillback rockfish relative abundance index log2, by depth interval surveyed, in weight of fish minute-1 for non-zero catches from the jig surveys conducted in 1986, 1987, 1988, 1992 and 2004. The regression line of the median non-zero catch rates is shown as a green line. Annual growth rate (r) and the series growth rate (R) are shown. Red columns at the bottom of the plots show the proportion of zero catches by year and the blue numbers (n) under the columns show the number of positive sets.

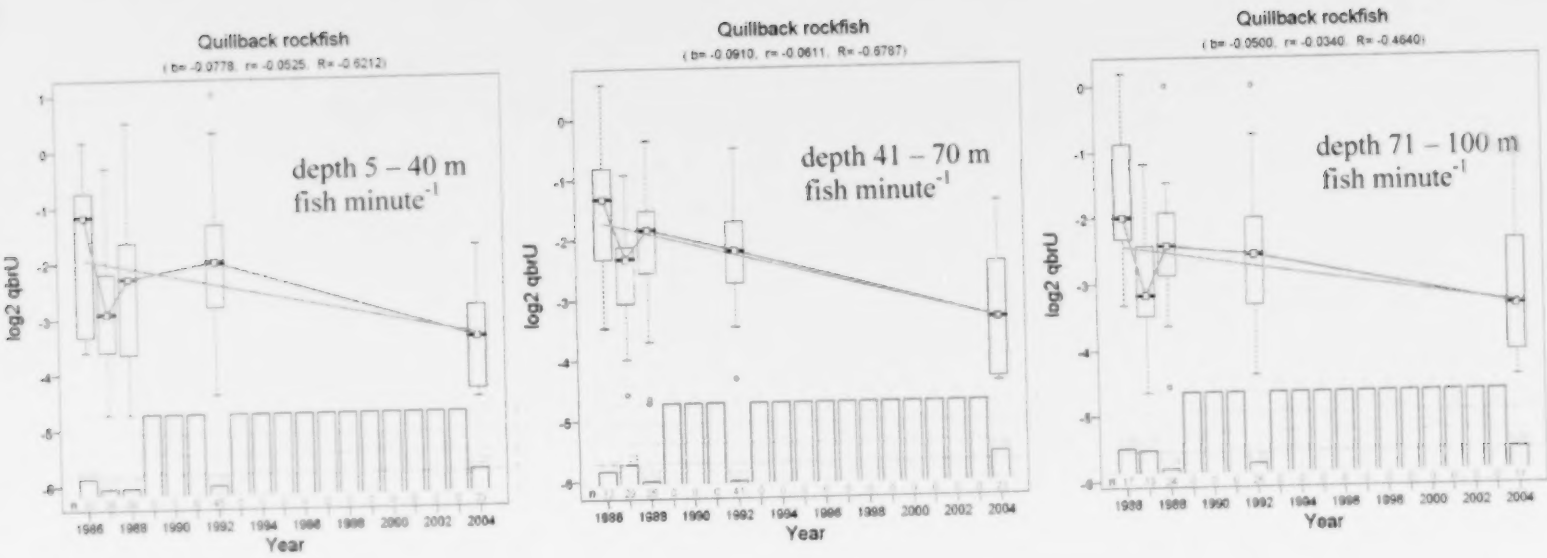

Figure 17. Quillback rockfish relative abundance index log2, by depth interval surveyed, in numbers of fish minute-1 for non-zero catches from the jig surveys conducted in 1986, 1987, 1988, 1992 and 2004. The regression line of the median non-zero catch rates is shown as a green line. Annual growth rate (r) and the series growth rate (R) are shown. Red columns at the bottom of the plots show the proportion of zero catches by year and the blue numbers (n) under the columns show the number of positive sets.

Appendix Table 1. Summary of fishing conditions and species caught from each record. Columns listed are date, vessel , set number, site number, start time of set, minimum depth, maximum depth, median depth, wind direction (WD), beaufort scale code (B), tidal phase code (TD), cloud cover percentage (CC), sun shining (SUN), total fishing time (EFF), and the number of each species caught during the 2004 survey.

DATE	VESSEL	SET	SITE	START TIME	MIN(m)	MAX(m)	MED(m)	WD	B	TD	CC	SUN	EFF	044	066	222	407	414	418	424	426	433	439	442	455	461	467	502	504	596	626
1/6/2004	LIFETIMER	1	66	7:46:00 AM	40	68	54	315	0	1	100	N	0.34							2						1					
1/6/2004	LIFETIMER	2	66	8:44:00 AM	16	35	25.5	315	0	2	99	N	0.37				1			1						3					
1/6/2004	LIFETIMER	3	42	10:06:00 AM	10	17	13.5		0	2	100	Y	0.35				1									2					
1/6/2004	LIFETIMER	4	38	10:57:00 AM	16	40	28		1	2	100	Y	0.33							2						1		1			
1/6/2004	LIFETIMER	5	38	11:40:00 AM	46	56	51	315	1	2	100	Y	0.35													1					
1/6/2004	LIFETIMER	6	66	1:40:00 PM	70	98	84		1	4	100	Y	0.27							3											
2/6/2004	LIFETIMER	7	31	7:42:00 AM	40	57	48.5	315	1	5	10	Y	0.35							1											
2/6/2004	LIFETIMER	8	16	8:35:00 AM	9	35	22		1	2	20	Y	0.36				2		2				1					2	1		
2/6/2004	LIFETIMER	9	16	9:20:00 AM	41	71	56		1	2	10	Y	0.35						2	3						1	1				
2/6/2004	LIFETIMER	10	16	10:15:00 AM	80	89	84.5		1	2	10	Y	0.34							2											
2/6/2004	LIFETIMER	11	36	10:56:00 AM	42	44	43	315	2	2	20	Y	0.33																	1	
2/6/2004	LIFETIMER	12	36	11:20:00 AM	24	32	28	315	2	2	20	Y	0.36							4							1				
2/6/2004	LIFETIMER	13	31	1:00:00 PM	16	22	19		0	2	20	Y	0.34				1														
3/6/2004	LIFETIMER	14	6	7:55:00 AM	40	70	55		1	4	0	Y	0.33							1						1		2	1		
3/6/2004	LIFETIMER	15	6	8:30:00 AM	71	100	85.5		1	2	0	Y	0.35						1	5								1			
3/6/2004	LIFETIMER	16	6	10:05:00 AM	13	40	26.5		1	2	0	Y	0.35				1			4						5		1			
3/6/2004	LIFETIMER	17	4	10:55:00 AM	52	57	54.5		1	2	5	Y	0.34			1				1						3			1		
3/6/2004	LIFETIMER	18	4	12:45:00 PM	14	35	24.5		1	2	5	Y	0.36							1						2		1			
3/6/2004	LIFETIMER	19	22	1:40:00 PM	70	90	80		1	5	5	Y	0.02			1															
3/6/2004	LIFETIMER	20	66	4:00:00 PM	15	43	29	315	1	4	20	Y	0.34				1		1	2											
4/6/2004	LIFETIMER	21	16	7:30:00 AM	11	40	25.5	135	1	4	40	Y	0.35				1			1						3		4			
4/6/2004	LIFETIMER	22	16	8:00:00 AM	40	70	55	135	1	4	50	Y	0.32							2											
4/6/2004	LIFETIMER	23	65	10:30:00 AM	6	25	15.5	135	3	2	90	Y	0.33													4					
4/6/2004	LIFETIMER	24	65	11:00:00 AM	71	95	83	135	3	2	95	Y	0.35						1	1											
4/6/2004	LIFETIMER	25	65	12:00:00 PM	42	70	56	135	2	2	95	Y	0.33							4							1				
4/6/2004	LIFETIMER	26	31	1:40:00 PM	15	30	22.5	135	2	2	100	Y	0.36																		
5/6/2004	LIFETIMER	27	22	8:20:00 AM	71	74	72.5	45	1	4	66	Y	0.35							1											1
5/6/2004	LIFETIMER	28	22	9:00:00 AM	39	54	46.5		1	4	80	N	0.35				1														
5/6/2004	LIFETIMER	29	22	9:45:00 AM	11	43	27		1	4	90	N	0.36							3											
5/6/2004	LIFETIMER	30	31	10:20:00 AM	70	103	86.5		1	5	80	N	0.34							4											
5/6/2004	LIFETIMER	31	38	12:15:00 PM	79	109	94	180	2	2	95	N	0.27							1				1							
5/6/2004	LIFETIMER	32	38	1:15:00 PM	43	64	53.5	135	3	2	95	N	0.34				1			6			1			2	1				
5/6/2004	LIFETIMER	33	38	2:30:00 PM	15	40	27.5	135	2	2	98	N	0.34				2		1	6						2					
6/6/2004	LIFETIMER	34	42	8:20:00 AM	5	14	9.5	315	1	4	60	Y	0.35							2						6		1			
6/6/2004	LIFETIMER	35	36	9:02:00 AM	18	38	28	315	1	4	70	Y	0.35							6						1					

Appendix Table 1 continued.

DATE	VESSEL	SET	SITE	START TIME	MIN(m)	MAX(m)	MED(m)	WD	B	TD	CC	SUN	EFF	044	066	222	407	414	418	424	426	433	439	442	455	461	467	502	504	596	626
6/6/2004	LIFETIMER	36	36	9:55:00 AM	39	42	40.5	315	1	4	50	Y	0.35							1											
6/6/2004	LIFETIMER	37	16	10:25:00 AM	71	100	85.5	315	1	4	50	Y	0.32																		
6/6/2004	LIFETIMER	38	38	11:20:00 AM	66	104	85	315	1	2	70	N	0.34							2							1				
6/6/2004	LIFETIMER	39	22	1:30:00 PM	71	98	84.5	315	1	2	40	Y	0.35			1				2											
7/6/2004	LIFETIMER	40	4	7:03:00 AM	51	53	52	315	1	4	100	N	0.36																		
7/6/2004	LIFETIMER	41	4	8:15:00 AM	15	40	27.5		0	4	100	N	0.33							1						2		2			
7/6/2004	LIFETIMER	42	6	8:55:00 AM	71	98	84.5		1	4	98	N	0.36							1											
7/6/2004	LIFETIMER	43	6	9:25:00 AM	53	70	61.5		1	4	70	Y	0.35							4											1
7/6/2004	LIFETIMER	44	6	10:10:00 AM	14	38	26		1	4	95	N	0.34							6	1					4	1				1
7/6/2004	LIFETIMER	45	66	11:35:00 AM	71	106	88.5	315	1	2	25	Y	0.34					1	1	3				1							
7/6/2004	LIFETIMER	46	66	1:15:00 PM	14	30	22	315	2	2	0	Y	0.34				1			1						1					
8/6/2004	LIFETIMER	47	31	8:25:00 AM	71	94	82.5	315	1	4	100	N	0.32	1																	
8/6/2004	LIFETIMER	48	31	8:50:00 AM	40	70	55	315	1	4	100	N	0.34							4						1	2				
8/6/2004	LIFETIMER	49	31	9:40:00 AM	8	39	23.5	315	1	4	100	N	0.35													6					
8/6/2004	LIFETIMER	50	65	10:35:00 AM	44	55	49.5	315	1	4	100	N	0.34							3								1			
8/6/2004	LIFETIMER	51	65	11:05:00 AM	17	32	24.5	315	1	4	100	N	0.33						1							3	1				
8/6/2004	LIFETIMER	52	22	12:05:00 PM	11	28	19.5	315	1	4	100	N	0.34													1	1	1			
8/6/2004	LIFETIMER	53	22	12:45:00 PM	43	68	55.5	315	1	5	100	N	0.34							1										1	
8/6/2004	LIFETIMER	54	65	1:20:00 PM	87	98	92.5	315	1	2	100	N	0.21		1				2	7			1								
8/6/2004	LIFETIMER	55	66	2:20:00 PM	60	70	65	315	2	2	100	N	0.33							1				2							
9/6/2004	LIFETIMER	56	36	7:04:00 AM	22	39	30.5	315	3	4	100	N	0.34							3						2					
9/6/2004	LIFETIMER	57	36	8:15:00 AM	44	46	45	315	3	4	100	N	0.35																		
9/6/2004	LIFETIMER	58	38	8:45:00 AM	8	40	24	315	3	4	100	N	0.33				1		1	2						1					
9/6/2004	LIFETIMER	59	38	9:40:00 AM	71	104	87.5	315	3	4	100	N	0.34	1						3											
9/6/2004	LIFETIMER	60	38	10:40:00 AM	41	62	51.5	315	3	4	100	N	0.33							2											
9/6/2004	LIFETIMER	61	42	11:45:00 AM	10	16	13	315	3	4	100	N	0.34				1									4					
9/6/2004	LIFETIMER	62	31	1:05:00 PM	18	40	29	315	3	4	100	N	0.33				1		1	1						2					
10/6/2004	LIFETIMER	63	31	7:10:00 AM	78	85	81.5	315	2	2	100	N	0.34						3	4											
10/6/2004	LIFETIMER	64	31	8:05:00 AM	41	68	54.5	315	2	3	100	N	0.35													1					
10/6/2004	LIFETIMER	65	65	8:50:00 AM	14	36	25	315	2	4	100	N	0.34							1						2					
10/6/2004	LIFETIMER	66	65	9:30:00 AM	41	70	55.5	315	3	4	100	N	0.26						4	4						2	1				
10/6/2004	LIFETIMER	67	66	12:00:00 PM	41	70	55.5	315	3	4	100	N	0.33							1		1					1				
10/6/2004	LIFETIMER	68	66	12:40:00 PM	10	31	20.5	315	3	4	100	N	0.33						1	2						3					

Appendix Table 1 continued.

DATE	VESSEL	SET	SITE	START TIME	MIN(m)	MAX(m)	MED(m)	WD	B	TD	CC	SUN	EFF	044	066	222	407	414	418	424	426	433	439	442	455	461	467	502	504	596	626
4/6/2004	SEATOAD	1	6	7:35:00 AM	41	58	49.5	135	0	4	40	Y	0.35							8						1					
4/6/2004	SEATOAD	2	6	8:29:00 AM	71	76	74.5	135	0	4	65	Y	0.34			1															
4/6/2004	SEATOAD	3	6	8:56:00 AM	19	31	25	135	0	4	70	Y	0.36							3						2					
4/6/2004	SEATOAD	4	22	9:44:00 AM	44	54	49	135	1	4	85	Y	0.34						3												
4/6/2004	SEATOAD	5	22	10:13:00 AM	10	34	22	135	1	4	90	Y	0.37				2			2	2					1					
4/6/2004	SEATOAD	6	65	11:05:00 AM	72	77	74.5	135	0	4	80	Y	0.36																		
4/6/2004	SEATOAD	7	65	11:18:00 AM	42	53	47.5	135	1	5	90	Y	0.32							1						1					
4/6/2004	SEATOAD	8	65	11:40:00 AM	12	30	21	135	1	2	95	Y	0.35							1						4			1		
4/6/2004	SEATOAD	9	22	12:26:00 PM	71	80	75.5	135	0	2	95	Y	0.35																		
4/6/2004	SEATOAD	10	66	1:30:00 PM	41	60	50.5	135	0	2	100	Y	0.35																		
5/6/2004	SEATOAD	11	42	8:25:00 AM	11	17	14	270	0	1	80	Y	0.35													1					
5/6/2004	SEATOAD	12	36	9:01:00 AM	11	30	20.5	270	0	1	85	Y	0.35							2						2					
5/6/2004	SEATOAD	13	36	9:34:00 AM	41	41	41	270	0	4	85	Y	0.32			1									1						
5/6/2004	SEATOAD	14	38	10:04:00 AM	13	30	21.5	270	0	4	90	N	0.33				5		4	1						2					
5/6/2004	SEATOAD	15	38	10:53:00 AM	42	54	48	270	0	4	80	Y	0.30							1											
5/6/2004	SEATOAD	16	38	11:07:00 AM	71	82	76.5	270	0	4	75	Y	0.32							4											
5/6/2004	SEATOAD	17	16	12:12:00 PM	18	40	29	135	0	4	50	Y	0.35							3						4					
5/6/2004	SEATOAD	18	16	12:55:00 PM	71	91	81	135	0	2	70	Y	0.35							4											
5/6/2004	SEATOAD	19	16	1:15:00 PM	43	62	52.5	135	0	2	80	N	0.35						2	1											
6/6/2004	SEATOAD	20	4	8:35:00 AM	6	30	18		0	2	35	Y	0.34													5		1			
6/6/2004	SEATOAD	21	4	9:12:00 AM	45	51	48		0	2	30	Y	0.28															1			
6/6/2004	SEATOAD	22	6	10:13:00 AM	20	33	26.5		0	2	30	Y	0.35						1	2						2		1			
6/6/2004	SEATOAD	23	6	10:45:00 AM	45	55	50		0	3	20	Y	0.35							2						1					
6/6/2004	SEATOAD	24	31	11:48:00 AM	18	40	29	315	0	3	20	Y	0.35				1			1						1	1				
6/6/2004	SEATOAD	25	31	12:24:00 PM	41	65	53	315	0	3	25	Y	0.27							3						1	2				
6/6/2004	SEATOAD	26	31	12:58:00 PM	74	99	86.5		0	5	40	Y	0.28	1						1											
6/6/2004	SEATOAD	27	66	1:26:00 PM	73	100	86.5		0	5	20	Y	0.32							1						1					
6/6/2004	SEATOAD	28	22	2:13:00 PM	10	30	20		0	5	15	Y	0.35				1		1	2	2					1		2			
7/6/2004	SEATOAD	29	22	7:17:00 AM	79	94	86.5		0	3	100	N	0.35						1	2											
7/6/2004	SEATOAD	30	22	7:47:00 AM	48	70	59		0	3	100	N	0.35													1					
7/6/2004	SEATOAD	31	16	6:35:00 AM	44	64	54		0	4	100	N	0.33						1												
7/6/2004	SEATOAD	32	16	9:00:00 AM	17	37	27		0	4	80	Y	0.35							1						3		1			
7/6/2004	SEATOAD	33	16	9:35:00 AM	71	93	82	315	0	4	65	Y	0.33							1											
												TOTAL		3	1	5	25	1	35	176	5	1	3	4	1	107	15	23	4	2	3

Appendix Table 2. Sea state and tidal phase codes and descriptions.

Code	Description
Beaufort scale	
0	CALM, <1 KN/H, SEA LIKE MIRROR
1	LIGHT AIR, 1-3 KN/H, RIPPLES, NO FOAM CRESTS
2	LIGHT BREEZE, 4-6 KN/H, SMALL WAVELETS
3	GENTLE BREEZE, 7-10 KN/H, CRESTS BREAKING
4	MODERATE BREEZE, 11-16 KN/H, WHITECAPS
5	FRESH BREEZE, 17-21 KN/H, MODERATE WAVES-SPRAY
6	STRONG BREEZE, 22-27 KN/H, LARGE WAVES
7	MODERATE GALE, 28-33 KN/H, SEA HEAPS UP
8	FRESH GALE, 34-40 KN/H, MODERATELY HIGH WAVES
9	STRONG GALE, 41-47 KN/H, HIGH WAVES, SPRAY
10	WHOLE GALE, 48-55 KN/H, OVERHANGING CRESTS, SEA WHITE
11	STORM, 56-63, KN/H, EXCEPTIONALLY HIGH WAVES
12	HURRICANE, 64-118, KN/H, SEA WHITE
Tide	
1	LOW SLACK
2	FLOOD
3	HIGH SLACK
4	EBB
5	SLACK

Appendix Table 3. Common fish names, scientific names, species codes, and survey year of catch. Highlighted rows indicate the species caught in all surveys.

Common Name	Scientific name	Species code	1986	1987	1988	1992	2004
ROCKFISH							
Black rockfish	SEBASTES MELANOPS	426	+	+	+	+	+
Canary rockfish	SEBASTES PINNIGER	437	–	–	–	+	–
Copper rockfish	SEBASTES CAURINUS	407	+	+	+	+	+
Dusky rockfish	SEBASTES CILIATUS	409	+	+	–	–	–
Greenstriped rockfish	SEBASTES ELONGATUS	414	–	–	+	+	+
Harlequin rockfish	SEBASTES VARIEGATUS	446	–	–	–	+	–
Quillback rockfish	SEBASTES MALIGER	424	+	+	+	+	+
Redstripe rockfish	SEBASTES PRORIGER	439	+	–	+	+	+
Sharpchin rockfish	SEBASTES ZACENTRUS	450	–	–	–	+	–
Tiger rockfish	SEBASTES NIGROCINCTUS	433	–	+	+	+	+
Widow rockfish	SEBASTES ENTOMELAS	417	–	+	+	+	–
Yelloweye rockfish	SEBASTES RUBERRIMUS	442	+	+	+	+	+
Yellowtail rockfish	SEBASTES FLAVIDUS	418	+	+	+	+	+
FLATFISH							
Arrowtooth flounder	ATHERESTHES STOMIAS	602	–	–	–	+	–
Dover sole	MICROSTOMUS PACIFICUS	626	–	–	–	–	+
Flathead sole	HIPPOGLOSSOIDES ELASSODON	612	+	–	–	–	–
Pacific sanddab	CITHARICHTHYS SORDIDUS	596	–	–	–	+	+
Righteye flounders	PLEURONECTIDAE	599	–	+	–	–	–
Rock sole	LEPIDOPSETTA BILINEATUS	621	+	–	+	–	–
Speckled sanddab	CITHARICHTHYS STIGMAEUS	598	–	–	–	+	–
OTHER GROUNDFISH							
Brown irish lord	HEMILEPIDOTUS SPINOSUS	504	–	+	–	+	+
Cabezon	SCORPAENICHTHYS MARMORATUS	540	–	–	–	+	–
Great sculpin	MYOXOCEPHALUS POLYACANTHOCEPHALUS	521	+	–	–	–	–
Kelp greenling	HEXAGRAMMOS DECAGRAMMUS	461	+	+	+	+	+
Lingcod	OPHIODON ELONGATUS	467	+	+	+	+	+
Pacific cod	GADUS MACROCEPHALUS	222	+	+	+	+	+
Pacific staghorn sculpin	LEPTOCOTTUS ARMATUS	518	–	+	–	–	–
Red irish lord	HEMILEPIDOTUS HEMILEPIDOTUS	502	+	+	+	+	+
Sablefish	ANOPLOPOMA FIMBRIA	455	–	–	+	+	+
Sculpins	COTTIDAE	472	–	+	–	–	–
Spiny dogfish	SQUALUS ACANTHIAS	044	+	+	+	+	+
Spotted ratfish	HYDROLAGUS COLLIEI	066	+	+	+	+	+
Walleye pollock	THERAGRA CHALCOGRAMMA	228	–	–	+	–	–
OTHER SPECIES							
Chinook salmon	ONCORHYNCHUS TSHAWYTSCHA	124	+	–	–	–	–
Unknown fish		015	–	–	–	+	–
		Counts:	17	18	18	25	18

Appendix Table 4. Date, site, median depth (m), sex, fork length (mm), weight (g), maturity, fish number, and fisher identification for landed rockfish species. Data are presented by species, sex and length. Fish numbers indicate otolith sample taken.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Black rockfish	6/7/2004	6	26	M	339	615	2	426001	2
	6/4/2004	22	22	M	322	565	2	426501	4
	6/4/2004	22	22	M	320	515	1	426502	6
	6/6/2004	22	20	M	429	1300	7	426503	4
	6/6/2004	22	20	F	460	1450	7	426504	4
Sample count:								5	
Copper rockfish	6/1/2004	66	25.5	M	358	870	7	407001	3
(no sample record	6/1/2004	42	13.5	M	324	515	7	407002	3
available for 1 fish)	6/2/2004	16	22	F	368	695	3	407003	2
	6/2/2004	16	22	F	258	250	2	407004	3
	6/2/2004	31	19	F	539	560	7	407005	1
	6/3/2004	6	26.5	F	285	390	3	407006	1
	6/3/2004	66	29	F	291	405	3	407007	4
	6/4/2004	16	25.5	F	300	395	3	407008	3
	6/4/2004	22	22	F	333	610	3	407009	4
	6/4/2004	22	22	M	271	258	3	407010	4
	6/5/2004	22	46.5	F	331	576	3	407011	3
	6/5/2004	38	53.5	F	402	1250	3	407012	2
	6/5/2004	38	27.5	F	368	825	3	407013	1
	6/7/2004	66	22	M	338	605	3	407014	3
	6/9/2004	38	24	F	338	620	3	407015	3
	6/9/2004	42	13	F	335	585	3	407016	3
	6/9/2004	31	29	M	354	720	3	407017	3
	6/5/2004	38	21.5	M	295	395	3	407501	6
	6/5/2004	38	21.5	M	335	535	3	407502	5
	6/5/2004	38	21.5	F	412	1150	7	407503	4
	6/5/2004	38	21.5	F	381	880	3	407504	6
	6/5/2004	38	21.5	M	374	840	7	407505	5
	6/6/2004	31	29	F	375	750	7	407506	5
	6/6/2004	22	20	M	305	435	2	407507	5
Sample count:								24	
Greenstripe rockfish (no sample record for 1 fish)	6/7/2004	66	87	-	-	-	-	-	-
Quillback rockfish	6/1/2004	66	54	M	409	1235	7	424001	1
(no sample record	6/1/2004	66	54	F	338	580	7	424002	2
available for 1 fish)	6/1/2004	66	25.5	M	290	400	7	424003	1
	6/1/2004	38	28	F	311	540	7	424004	3
	6/1/2004	38	28	F	328	630	6	424005	1
	6/1/2004	66	84	F	370	885	6	424006	3
	6/1/2004	66	84	F	345	790	6	424007	2
	6/1/2004	66	84	F	414	1065	6	424008	3
	6/2/2004	31	48.5	F	341	595	2	424009	3
	6/2/2004	16	56	M	400	1016	7	424010	3
	6/2/2004	16	56	F	286	390	2	424011	1
	6/2/2004	16	56	M	287	355	2	424012	1
	6/2/2004	16	84.5	M	418	1160	7	424013	1
	6/2/2004	16	84.5	F	311	460	2	424014	3
	6/2/2004	36	28	M	356	770	7	424015	1

Appendix Table 4. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Quillback rockfish	6/2/2004	36	28	M	290	420	2	424016	1
	6/2/2004	36	28	F	280	335	1	424017	1
	6/2/2004	36	28	F	234	195	1	424018	3
	6/3/2004	6	55	F	344	715	3	424019	2
	6/3/2004	6	85.5	M	361	855	7	424020	3
	6/3/2004	6	85.5	F	398	1145	3	424021	2
	6/3/2004	6	85.5	M	427	1475	7	424022	1
	6/3/2004	6	85.5	M	430	1350	7	424023	3
	6/3/2004	6	85.5	F	370	875	3	424024	1
	6/3/2004	6	26.5	M	309	470	2	424025	2
	6/3/2004	6	26.5	F	329	590	7	424026	1
	6/3/2004	6	26.5	M	334	590	3	424027	1
	6/3/2004	6	26.5	M	335	690	7	424028	1
	6/3/2004	4	54.5	M	335	685	7	424029	1
	6/3/2004	4	24.5	M	252	255	1	424030	2
	6/3/2004	66	29	F	380	1020	3	424031	4
	6/3/2004	66	29	F	299	510	3	424032	5
	6/4/2004	16	25.5	F	310	435	7	424033	1
	6/4/2004	16	55	F	384	1005	3	424034	1
	6/4/2004	16	55	M	350	715	7	424035	3
	6/4/2004	65	83	M	408	1085	3	424036	1
	6/4/2004	65	56	M	359	780	2	424037	3
	6/4/2004	65	56	F	307	485	3	424038	1
	6/4/2004	65	56	M	378	385	1	424039	3
	6/4/2004	65	56	M	298	445	1	424040	3
	6/4/2004	6	49.5	M	357	805	3	424041	5
	6/4/2004	6	49.5	F	310	550	3	424042	4
	6/4/2004	6	49.5	F	362	1060	3	424043	4
	6/4/2004	6	49.5	F	336	595	3	424044	4
	6/4/2004	6	49.5	F	314	530	3	424045	5
	6/4/2004	6	49.5	F	345	695	3	424046	6
	6/4/2004	6	49.5	F	347	790	3	424047	4
	6/4/2004	6	49.5	M	345	725	3	424048	4
	6/4/2004	6	25	M	218	535	2	424049	6
	6/4/2004	6	25	F	238	230	2	424050	6
	6/4/2004	6	25	F	200	480	7	424051	4
	6/4/2004	22	22	F	258	835	2	424052	6
	6/4/2004	22	22	M	329	565	3	424053	4
	6/4/2004	65	47.5	F	352	750	3	424054	4
	6/4/2004	65	21	M	300	505	2	424055	4
	6/5/2004	22	72.5	M	331	625	3	424056	3
	6/5/2004	22	27	F	311	505	3	424057	3
	6/5/2004	22	27	M	326	625	3	424058	2
	6/5/2004	22	27	F	306	480	3	424059	1
	6/5/2004	31	86.5	M	372	865	3	424060	3
	6/5/2004	31	86.5	M	356	750	3	424061	2
	6/5/2004	31	86.5	F	379	920	3	424062	2
	6/5/2004	31	86.5	F	371	846	3	424063	1
	6/5/2004	38	53.5	F	344	730	3	424064	1
	6/5/2004	38	53.5	F	323	645	3	424065	3
	6/5/2004	38	53.5	F	339	700	3	424066	2
	6/5/2004	38	53.5	F	299	465	7	424067	3

Appendix Table 4. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Quillback rockfish	6/5/2004	38	53.5	M	260	360	1	424068	1
	6/5/2004	38	53.5	F	262	315	2	424069	2
	6/5/2004	38	27.5	M	304	490	3	424070	2
	6/5/2004	38	27.5	F	314	565	3	424071	1
	6/5/2004	38	27.5	M	264	330	2	424072	1
	6/5/2004	38	27.5	F	304	590	3	424073	3
	6/5/2004	38	27.5	M	319	645	3	424074	2
	6/5/2004	38	27.5	M	276	380	2	424075	2
	6/6/2004	42	9.5	F	334	680	3	424076	3
	6/6/2004	42	9.5	M	269	335	2	424077	3
	6/6/2004	36	28	M	324	570	7	424078	1
	6/6/2004	36	28	F	311	470	3	424079	3
	6/6/2004	36	28	F	330	615	3	424080	1
	6/6/2004	36	28	M	334	635	7	424081	1
	6/6/2004	36	28	F	373	770	7	424082	2
	6/6/2004	36	28	M	251	265	1	424083	1
	6/6/2004	36	40.5	M	409	1190	7	424084	1
	6/6/2004	38	85	F	388	1110	7	424085	2
	6/6/2004	38	85	F	417	1575	3	424086	1
	6/6/2004	22	84.5	F	434	1396	3	424087	3
	6/6/2004	22	84.5	F	402	1088	7	424088	2
	6/7/2004	4	27.5	F	325	535	3	424089	3
	6/7/2004	6	84.5	F	345	730	3	424090	1
	6/7/2004	6	61.5	F	286	380	2	424091	1
	6/7/2004	6	61.5	F	378	900	3	424092	3
	6/7/2004	6	61.5	F	311	490	3	424093	3
	6/7/2004	6	61.5	M	320	510	2	424094	1
	6/7/2004	6	26	M	335	580	3	424095	2
	6/7/2004	6	26	F	340	650	3	424096	1
	6/7/2004	6	26	M	346	685	3	424097	2
	6/7/2004	6	26	M	315	535	3	424098	1
	6/7/2004	6	26	M	364	690	3	424099	1
	6/7/2004	6	26	M	328	645	3	424100	2
	6/7/2004	66	88.5	F	369	830	3	424101	2
	6/7/2004	66	88.5	F	351	670	3	424102	1
	6/7/2004	66	88.5	M	392	1005	3	424103	1
	6/7/2004	66	22	F	308	515	2	424104	2
	6/8/2004	31	55	M	314	585	3	424105	1
	6/8/2004	31	55	M	330	695	3	424106	3
	6/8/2004	31	55	M	347	775	3	424107	3
	6/8/2004	31	55	M	313	540	3	424108	1
	6/8/2004	65	49.5	M	329	590	3	424109	2
	6/8/2004	65	49.5	M	369	840	3	424110	1
	6/8/2004	65	49.5	F	339	660	3	424111	3
	6/8/2004	22	55.5	M	280	325	2	424112	2
	6/8/2004	65	92.5	F	361	740	3	424113	2
	6/8/2004	65	92.5	M	413	1210	3	424114	3
	6/8/2004	65	92.5	M	410	1245	3	424115	1
	6/8/2004	65	92.5	F	429	1535	3	424116	2
	6/8/2004	65	92.5	F	426	1410	3	424117	3
	6/8/2004	65	92.5	M	337	645	2	424118	3

Appendix Table 4. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Quillback rockfish	6/8/2004	65	92.5	M	309	485	2	424119	1
	6/8/2004	66	65	M	294	530	2	424120	1
	6/9/2004	36	30.5	M	220	175	1	424121	2
	6/9/2004	36	30.5	F	255	275	2	424122	2
	6/9/2004	36	30.5	F	273	310	2	424123	3
	6/9/2004	38	24	F	284	415	3	424124	2
	6/9/2004	38	24	F	325	615	7	424125	1
	6/9/2004	38	87.5	M	322	670	2	424126	2
	6/9/2004	38	87.5	F	415	1400	3	424127	1
	6/9/2004	38	87.5	M	420	1340	3	424128	3
	6/9/2004	38	51.5	M	281	440	2	424129	3
	6/9/2004	38	51.5	M	279	360	2	424130	3
	6/9/2004	31	29	F	258	315	2	424131	2
	6/10/2004	31	81.5	M	329	595	1	424132	1
	6/10/2004	31	81.5	F	254	295	2	424133	3
	6/10/2004	31	81.5	F	366	830	3	424134	1
	6/10/2004	31	81.5	M	370	915	7	424135	1
	6/10/2004	65	25	F	339	730	3	424136	2
	6/10/2004	65	55.5	M	312	510	1	424137	1
	6/10/2004	65	55.5	F	367	815	3	424138	1
	6/10/2004	65	55.5	F	353	790	3	424139	1
	6/10/2004	65	55.5	F	320	540	2	424140	2
	6/10/2004	66	55.5	M	340	780	7	424141	1
	6/10/2004	66	20.5	M	334	725	7	424142	1
	6/10/2004	66	20.5	M	332	715	7	424143	1
	6/5/2004	36	20.5	M	294	425	2	424501	4
	6/5/2004	36	20.5	M	315	490	2	424502	6
	6/5/2004	38	21.5	F	294	415	3	424503	6
	6/5/2004	38	48	F	241	265	2	424504	6
	6/5/2004	38	76.5	M	390	1010	7	424505	4
	6/5/2004	38	76.5	F	280	350	3	424506	4
	6/5/2004	38	76.5	F	310	525	3	424507	6
	6/5/2004	38	76.5	M	252	265	2	424508	6
	6/5/2004	16	29	F	241	200	2	424509	4
	6/5/2004	16	29	M	316	525	7	424510	4
	6/5/2004	16	29	F	300	480	2	424511	4
	6/5/2004	16	81	F	414	1325	7	424512	6
	6/5/2004	16	81	F	357	755	3	424513	4
	6/5/2004	16	81	F	392	1070	7	424514	6
	6/5/2004	16	81	F	402	1115	7	424515	5
	6/5/2004	16	52.5	F	337	690	2	424516	6
	6/6/2004	6	26.5	M	341	680	3	424517	4
	6/6/2004	6	26.5	F	290	415	2	424518	6
	6/6/2004	6	50	F	335	635	3	424519	5
	6/6/2004	6	50	F	295	410	2	424520	6
	6/6/2004	31	29	F	325	595	7	424521	5
	6/6/2004	31	53	F	314	375	2	424522	4
	6/6/2004	31	53	M	330	635	7	424523	5
	6/6/2004	31	53	F	286	410	2	424524	4
	6/6/2004	31	86.5	F	360	770	3	424525	4
	6/6/2004	66	86.5	M	360	790	7	424526	4
	6/6/2004	22	20	M	337	585	7	424527	6

Appendix Table 4. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Quillback rockfish	6/6/2004	22	20	F	302	470	2	424528	6
	6/7/2004	22	86.5	M	350	745	3	424529	4
	6/7/2004	22	86.5	F	425	1260	7	424530	5
	6/7/2004	16	27	M	230	210	1	424531	6
	6/7/2004	16	82	F	390	1135	3	424532	6
Sample count:								175	
Redstripe rockfish	6/2/2004	16	22	F	238	170		439001	2
	6/5/2004	38	53.5	F	254	225	1	439002	1
	6/8/2004	65	92.5	M	296	335	1	439003	3
Sample count:								3	
Tiger rockfish	6/10/2004	66	55.5	M	412	1325	7	433001	1
Sample count:								1	
Yelloweye rockfish	6/5/2004	38	94	M	718	6365	6	442001	1
	6/7/2004	66	88.5	F	610	4265	3	442002	1
	6/8/2004	66	65	F	408	1145	2	442003	3
	6/8/2004	66	65	F	510	2385	3	442004	2
Sample count:								4	
Yellowtail rockfish (no sample records available for 4 fish)	6/2/2004	16	22	F	264	250	2	418001	3
	6/2/2004	16	56	F	349	645	2	418002	1
	6/2/2004	16	56	F	327	525	2	418003	2
	6/3/2004	6	85.5	M	274	295	1	418004	1
	6/4/2004	65	83	F	282	295	2	418005	1
	6/5/2004	38	27.5	M	275	335	1	418006	3
	6/7/2004	66	88.5	M	382	790	1	418007	3
	6/8/2004	65	92.5	M	331	525	1	418008	2
	6/8/2004	65	92.5	M	285	360	1	418009	3
	6/9/2004	38	24	M	441	1280	1	418010	1
	6/9/2004	31	29	M	372	765	2	418011	1
	6/10/2004	31	81.5	F	403	990	2	418012	3
	6/10/2004	31	81.5	M	353	670	1	418013	2
	6/10/2004	65	55.5	M	332	615	2	418014	1
	6/10/2004	65	55.5	M	320	490	1	418015	2
	6/10/2004	65	55.5	F	350	605	2	418016	2
	6/10/2004	65	55.5	F	335	535	2	418017	1
	6/10/2004	66	20.5	M	286	320	2	418018	1
	6/4/2004	22	49	M	327	545	1	418501	4
	6/4/2004	22	49	F	256	290	1	418502	4
	6/4/2004	22	49	M	342	590	1	418503	6
	6/5/2004	38	21.5	F	386	840	2	418504	4
	6/5/2004	38	21.5	M	296	390	2	418505	4
	6/5/2004	38	21.5	M	315	455	2	418506	4
	6/5/2004	38	21.5	M	293	380	1	418507	4
	6/5/2004	16	52.5	F	448	1340	2	418508	6
	6/7/2004	22	86.5	F	364	720	2	418509	6
	6/5/2004	16	52.5	F	414	1005	2	418509	4
	6/7/2004	16	54	F	342	630	2	418510	6
	6/6/2004	6	26.5	M	280	250	2	418510	4
	6/6/2004	22	20	F	385	830	2	418511	5
Sample count:								31	

Appendix Table 5. Date, site, median depth (m), sex, fork length (mm), weight (g), maturity, fish number, and fisher identification for catch other than rockfish. Fish numbers indicate that otoliths were sampled.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Brown irish lord	6/2/2004	16	22	F	254			1	3
	6/3/2004	6	55	F	205			2	3
	6/3/2004	4	54.5	F	254			3	1
	6/4/2004	65	21	F	242			4	5
Sample count:								4	
Dover sole									
(no sample record	6/5/2004	22	72.5	F	315			1	3
available for 1 fish)	6/7/2004	6	61.5	F	341			2	1
Sample count:								2	
Kelp greenling	6/1/2004	66	54	M	361			1	3
(no sample record	6/9/2004	42	13	F	385			1	2
available for 3 fish)	6/3/2004	6	26.5	M	370			10	1
	6/7/2004	16	27	F	360			100	4
	6/7/2004	16	27	F	408			101	5
	6/2/2004	16	56	M	384			102	3
	6/3/2004	6	26.5	M	365			11	1
	6/3/2004	6	26.5	M	355			12	2
	6/3/2004	6	26.5	M	367			13	3
	6/3/2004	6	26.5	M	315			14	3
	6/3/2004	4	54.5	M	347			15	1
	6/3/2004	4	54.5	F	351			16	2
	6/3/2004	4	54.5	F	324			17	2
	6/3/2004	4	24.5	M	332			18	2
	6/3/2004	4	24.5	M	377			19	3
	6/10/2004	31	54.5	F	386			2	1
	6/1/2004	66	25.5	M	348			2	1
	6/4/2004	16	25.5	F	420			20	1
	6/4/2004	16	25.5	F	360			21	2
	6/4/2004	16	25.5	M	384			22	2
	6/4/2004	65	15.5	M	330			23	2
	6/4/2004	65	15.5	F	327			24	2
	6/4/2004	65	15.5	M	349			25	3
	6/4/2004	65	15.5	M	336			26	3
	6/5/2004	38	53.5	M	372			27	1
	6/5/2004	38	53.5	M	336			28	1
	6/5/2004	38	27.5	M	354			29	1
	6/1/2004	66	25.5	M	343			3	1
	6/5/2004	38	27.5	M	332			30	2
	6/6/2004	42	9.5	M	366			31	1
	6/6/2004	42	9.5	M	380			32	1
	6/6/2004	42	9.5	M	364			33	1
	6/6/2004	42	9.5	M	363			34	1
	6/6/2004	42	9.5	M	357			35	3
	6/6/2004	42	9.5	M	365			36	3

Appendix Table 5. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Kelp greenling	6/6/2004	36	28	F	355			37	2
	6/7/2004	4	27.5	M	334			38	3
	6/7/2004	4	27.5	M	360			39	3
	6/1/2004	66	25.5	M	312			4	3
	6/7/2004	6	26	M	353			40	1
	6/7/2004	6	26	F	379			41	1
	6/7/2004	6	26	F	332			42	3
	6/7/2004	6	26	M	342			43	3
	6/7/2004	66	22	M	359			44	3
	6/8/2004	31	55	M	380			45	1
	6/8/2004	31	23.5	F	354			46	1
	6/8/2004	31	23.5	F	334			47	2
	6/8/2004	31	23.5	M	349			48	2
	6/8/2004	31	23.5	F	326			49	3
	6/1/2004	42	13.5	M	360			5	1
	6/8/2004	31	23.5	M	334			50	3
	6/8/2004	31	23.5	M	362			51	3
	6/8/2004	65	24.5	F	386			52	2
	6/8/2004	65	24.5	F	380			53	3
	6/8/2004	65	24.5	M	315			54	3
	6/8/2004	22	19.5	M	314			55	3
	6/9/2004	36	30.5	F	352			56	3
	6/9/2004	36	30.5	F	369			57	3
	6/9/2004	38	24	F	380			58	1
	6/9/2004	42	13	M	371			59	1
	6/1/2004	42	13.5	F	412			6	3
	6/9/2004	42	13	F	405			60	1
	6/9/2004	42	13	F	359			61	3
	6/9/2004	31	29	M	376			62	1
	6/9/2004	31	29	M	333			63	3
	6/10/2004	65	25	M	360			64	1
	6/10/2004	65	55.5	M	357			65	3
	6/10/2004	66	20.5	M	346			66	1
	6/10/2004	66	20.5	M	326			67	2
	6/10/2004	66	20.5	F	351			68	2
	6/4/2004	6	49.5	M	366			69	4
	6/1/2004	38	28	M	356			7	1
	6/4/2004	6	25	F	355			70	5
	6/4/2004	6	25	M	375	530		71	6
	6/4/2004	22	22	M	356			72	4
	6/4/2004	65	47.5	F	390			73	4
	6/4/2004	65	21	M	347			74	4
	6/4/2004	65	21	M	372			75	5
	6/4/2004	65	21	F	380	630		76	6
	6/5/2004	42	14	F	385			77	4
	6/5/2004	36	20.5	F	360			78	6
	6/5/2004	36	20.5	F	345			79	6

Appendix Table 5. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Kelp greenling	6/1/2004	38	51	M	399			8	2
	6/5/2004	38	21.5	M	355			80	5
	6/5/2004	38	21.5	F	355			81	6
	6/5/2004	16	29	F	340			82	5
	6/5/2004	16	29	F	349			83	5
	6/5/2004	16	29	F	373			84	6
	6/5/2004	16	29	F	350			85	6
	6/6/2004	4	18	M	355			86	4
	6/6/2004	4	18	M	345			87	4
	6/6/2004	4	18	M	370			88	5
	6/6/2004	4	18	M	342			89	6
	6/3/2004	6	55	M	347			9	1
	6/6/2004	4	18	F	381			90	6
	6/6/2004	6	26.5	F	352			91	4
	6/6/2004	6	26.5	F	400			92	4
	6/6/2004	6	50	F	365			93	4
	6/6/2004	31	29	F	403			94	4
	6/6/2004	31	53	F	362			95	4
	6/6/2004	66	86.5	M	330			96	6
	6/6/2004	22	20	F	349			97	4
	6/7/2004	22	59	M	379			98	4
	6/7/2004	16	27	F	386			99	4
Sample count:								104	
Lingcod	6/6/2004	38	85	F	575	1830	3	1	1
(no sample record	6/2/2004	16	56	F	892	6720		467001	2
available for 1 fiah)	6/2/2004	36	28	F	554	1535		467002	2
	6/4/2004	65	56	F	710	3155	3	467003	2
	6/5/2004	38	53.5	F	589	1925	2	467004	3
	6/7/2004	6	26	M	608	2145	3	467005	1
	6/8/2004	31	55	M	627	2220	3	467006	2
	6/8/2004	65	24.5	M	465	855	1	467007	3
	6/8/2004	22	19.5	F	594	1755	2	467008	2
	6/10/2004	65	55.5	F	595	1795	2	467009	1
	6/10/2004	66	55.5	F	738	4600	3	467010	2
	6/6/2004	31	29	M	555	1570	3	467501	4
	6/6/2004	31	53	M	552	1410	2	467502	6
	6/6/2004	31	53	M	666	2830	3	467503	5
Sample count:								14	
Pacific cod	6/3/2004	22	80	F	387			1	2
(no sample record	6/6/2004	22	84.5	F	359			2	2
available for 1 fish)	6/4/2004	6	74.5	F	401	600		3	5
	6/5/2004	36	41	F	350			4	6
Sample count:								4	
Pacific sanddab	6/2/2004	36	43	M	308			1	2
	6/8/2004	22	55.5	F	267			2	1
Sample count:								2	

Appendix Table 5. continued.

SPECIES	DATE	BLOCK	MED	SEX	LEN	WGT	MAT	FISH NO	FISHER ID
Red irish lord	6/1/2004	38	28	F	320			1	2
	6/6/2004	4	48	F	264			1	5
	6/4/2004	16	25.5	F	287			10	2
	6/4/2004	16	25.5	F	240			11	3
	6/4/2004	16	25.5	F	209			12	3
	6/6/2004	42	9.5	F	263			13	1
	6/7/2004	4	27.5	F	217			14	2
	6/7/2004	4	27.5	F	199			15	3
	6/8/2004	65	49.5	F	230			16	1
	6/8/2004	22	19.5	F	282			17	3
	6/6/2004	4	18	F	250			18	4
	6/6/2004	6	26.5	F	251			19	6
	6/2/2004	16	22	F	290			2	1
	6/6/2004	22	20	F	276			20	4
	6/6/2004	22	20	F	330			21	6
	6/7/2004	16	27	F	290			22	6
	6/2/2004	16	22	F	266			3	3
	6/3/2004	6	55	F	215			4	1
	6/3/2004	6	55	F	242			5	2
	6/3/2004	6	85.5	F	235			6	3
	6/3/2004	6	26.5	F	323			7	3
	6/3/2004	4	24.5	F	211			8	3
	6/4/2004	16	25.5	F	238			9	1
Sample count:								23	
Sablefish	6/5/2004	36	41	F	472			1	5
Sample count:								1	
Spiny dogfish	6/8/2004	31	82.5	M	830			1	2
	6/9/2004	38	87.5	M	895			2	1
	6/6/2004	31	86.5	M	750			3	5
Sample count:								3	
Spotted ratfish	6/8/2004	65	92.5	F	341			1	2
Sample count:								1	

Appendix Table 6. Codes used to descibe rockfish maturity stages (from Westrheim 1975) presented in Appendix Table 4 and 5.

Maturity Code	Gonad Condition
0	unknown
1	immature - translucent pink, males threadlike, females small
Females	
2	maturing-small, yellow eggs; no small black dots present (no reabsorbed larvae); translucent or opaque
3	mature-large, yellow or orange eggs; a few small black dots may be present (reabsorbed larvae); opaque
4	fertilized - large, orange-yellow eggs; translucent
5	embryos or larvae - include eyed eggs; translucent
6	spent - large, flaccid, red ovaries; a few larvae may be present
7	resting - moderate size, firm, orange-grey ovaries; some with dark blotches
Males	
2	maturing - string-like, slight swelling, translucent
3	developing - swelling, brown-white
4	developed - large, white; easily broken
5	running - running sperm
6	spent - white-brown; sperm still in duct
7	resting - triangular in cross-section; small, brown